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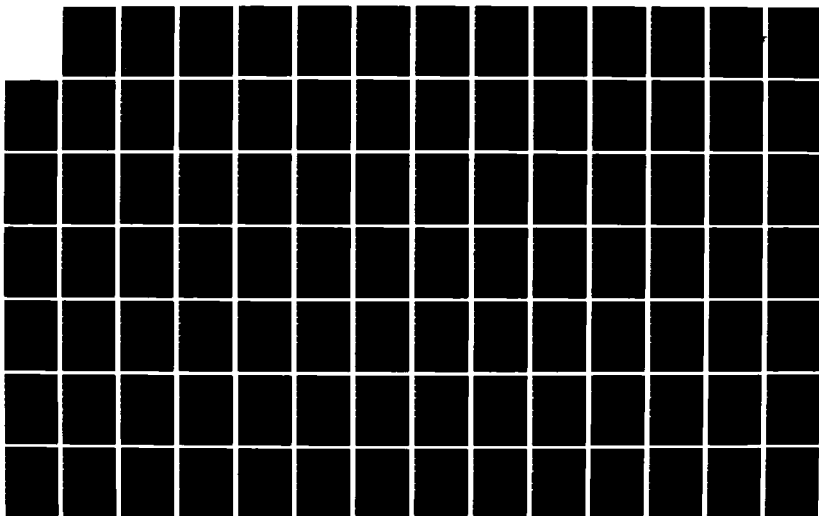
COMBINED STRESSES IN THE WORKPLACE SURVEY OF STATE OF  
PUBLISHED KNOWLEDGE(U) BIOSEARCH CO PHILADELPHIA PA  
A T KORNFIELD OCT 82 BSC-82-100 N00014-82-C-0357

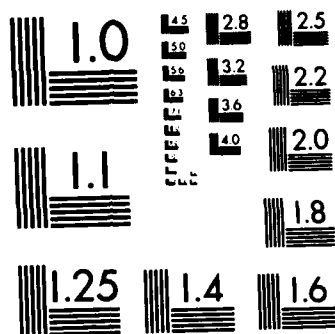
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Report BSC-82-100

ONR Contract N00014-82-C-0357

COMBINED STRESSES IN THE WORKPLACE

Report on the State of Knowledge

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Box 15965 Middle City  
Phila., PA 19103

October 1982

Final Report for period April-Oct.1982

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Prepared for:

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BETHESDA MD. 20014

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER BSC-82-100	2. GOVT ACCESSION NO. AD-A154 272	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) COMBINED STRESSES IN THE WORKPLACE, Survey of State of Published Knowledge		5. TYPE OF REPORT & PERIOD COVERED Final Rept. 4/82-10/82
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Alfred T. Kornfield, Ph.D.		8. CONTRACT OR GRANT NUMBER(s) N00014-82-C-0357
9. PERFORMING ORGANIZATION NAME AND ADDRESS The Biosearch Company Box 15965 Middle City Phila., Pa. 19103		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Fleet Occupational Health Office U.S. Naval Medical Res & Devel Cmd Nat Nav Med Ctr, Bethesda, Md. 20014		12. REPORT DATE October 1982
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This contains about 375 analytic extracts from selected reports in world serial literature, on combined stress studies, in the laboratory and workplace, on humans and animals. Stressor pairs (physical or chemical) link sound, vibration, acceleration, heat & cold, ionizing & nonionizing radiation, with chemical solvents, drugs, dusts, gases, vapors, metals. Comments on limits in reported work & on response interactions (synergy, potentiation) are included.		

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## SUMMARY

This report contains several hundred extracts prepared from selected reports on combined stress studies, in the workplace and the laboratory, on humans and animals. Stressor pairs of physical and chemical variables link sound, vibration, acceleration and impact, heat and cold, ionizing and non-ionizing radiation, chemical solvents, drugs, dusts, gases and vapors, metals etc. Brief comment is provided on the collective content of these papers as an image of this field, response interactions (synergistic, potentiating, additive, etc), and on limits and opportunities for further work. A supplemental set of key citations is provided.

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DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
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By	
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Avail and/or	Special
A1	



## PREFACE

This report has been prepared in accordance with format specified in MIL-STD-847A.

Acknowledgement is expressed for the material assistance of Mr. Buford Smith, of the NASA Technical Information Executive; Ms. Eleanor Goodchild of Univ of Penna Med Library; Ms. June Fulton of College of Physicians NLM Regional Medical Library; and Ms. Alice Makov of Thos Jefferson Med Library.

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Misc.Chemical CS	
Particles CS	
Gas/Vapor CS	
Epidemiology	
Surveys	
Supplemental Biblio I	
Supplemental Biblio II	

## 1. INTRODUCTION

In most occupations, including those in the shipyard and on shipboard, the worker is exposed to a complex pattern of several stressor factors (eg heat, sound, chemical) which may or not be in ranges safe for sustained human exposure. Until recently, the reasonable route of study has been of one variable at a time, to extreme response in animals and to injury end point in human volunteers; and the practical way to select exposure tolerance limits has been to deal with the most critically dangerous factor. But there is an increasing, albeit still scarce reporting of controlled studies or good observations on events involving 2 or more stresses imposed simultaneously or in close succession. It was the task of this study to locate and examine a sampling of these reports, to select, collate, and extract their message, within quite limited effort constraints. Reports dealing with standards, measurement, protective and other design, case histories were generally left out. Communications from other disciplines doing studies on interactive factors (aerospace simulation, cocarcinogenesis and combined therapy, etc) were acquired incidental to the main searches, to examine their concepts.

## 2. OBJECTIVES

To survey and present an image of the state of knowledge on combined stresses, as observed and reported from the work environment or lab.

To screen and acquire an adequate sample of available world literature dealing with a variety of stresses in combination.

To extract salient information from each report, and to provide an extract and citation for each paper, in a standard and accepted format.

To comment on the recovered material, its scope and limits, and to recommend other efforts to acquire new data, elucidate mechanism, and develop standards and other information to benefit the program in Fleet Occupational Health.

### 3. METHODS OF APPROACH

#### Introduction

To guide the search and analyses on combined stresses, the outline below of detailed information sought was devised, as concept frame and check list:

Specific Stressor Variables  $S_1$ ,  $S_2$ ,  $S_n$ :

Dose rate and level, spectral band, modulation and waveform, vector direction, entry portal, total dose, treatment timeform.

Combined Stressors: pattern, treatment

Subjects: species, number, age: human operator, observer, subject, patient, passerby.

Tasks and their Standards

Environment of Exposure: workplace (the industry and task), lab, clinic, public place.

Modifiers: illness, medication, smoking, alcohol use, nutrition, fatigue, hydration, adaptation, etc.

Responses to single and combined S:

Biochemical, physiological, behavioral, pathological.

Criteria, measures, thresholds

Interactive responses measured and discussed.

## Search and Acquisition of the Literature

Reports in the following disciplines and fields were examined:

### Occupational Health and Industrial Hygiene

Construction and shipbuilding  
Metalworking, foundry, smelting, plating  
Mining, mineral processing  
Chemical, ~~petroleum~~, petroleum, plastics

### Public Health eg

Pollution ecology; air, water, soil  
Epidemiology

### Military, Naval, Aerospace Engineering & Technology

### Clinical Medicine eg

Oncology: carcinogenesis, combined therapy  
Pathology, forensics  
Anesthesiology

### Sciences

Pharmacology and Toxicology  
Physiology: environmental, work  
Psychology: performance, work  
Nutrition

## Search and Acquisition of the Literature

The sources used repeatedly or consulted include these:

### Local Libraries:

College of Physicians: noted research library; used espec  
for foreign journals, monographs, NLM regional library services

Univ of Penna

Medical Library: one major working site for search/screen/  
recovery/copymaking

Applied Science Library: engineering journals, depository  
for certain documents eg NASA

Main (Van Pelt): other journals, reference services, foreign  
materials depository

Jefferson Medical Library: a major working site and complementary  
to Penn in its collection, esp occupat and environ hlth

Franklin Institute Library: (Sci Museum & Res Ctr): the major  
site for acquiring Russian and other foreign journals, also  
strongest industrial chemistry collection

Drexel Univ Library: gov doc depository, complementing others  
used

Public Library Phila: major regional govdoc depository and indices;  
also multiple on-line services

### Federal Gov Doc Collections

EPA Regional Ofc: Indices,  
reports, references

NIOSH Regional Ofc: indices,  
reports, references

OSHA Regional Ofc: reports,  
specialist consults

Energy regional ofc:

Nav Reg Med Ctr Library

HHS PHS Regional Ofc  
consults

### Special Data Bank Resources Used

Source	Online svcs directly used	Online done for Biosearch	Offline done by/for Biosearch
NLM	Medline, Toxline, etc	-----	Index Medicus, biblios and prints
NASA	Recon	Recon recoveries	STAR, WIP, repts, bibs
DTIC	-----	Tailored srchs	TAB, publists, WIP, abstr
NIH	-----	DRG tailored srchs	Res Awrds Indx, Spcl Pub
DisAbst	Dialog	Tailored srchs	DisAb Intl



## Acquisition Strategy

Expected sparsity of papers determined the broadest multi-discipline and multisource screening search:

- First online screening used subject terms and suspected sites
- First library shelf screens, with a selected journal list  
(about 200) looking at current issues and latest annual index.
- Compilation of first citations found, and xerox capture of nominally suitable reports
- A convergent series of searches, with identification and revision of lists of productive authors, journals, sites, and topics
- Exclusion of hard to obtain communications (journals, reports, monographs, espec foreign) and of unproductive material
- Extraction of additional sources from biblios of recovered papers
- Special attention to surveys of combined stress titles
- "forward tracking" through on-line bases for productive authors, through their moves and sources
- Exclusion of papers on measurement, design, cases, etc.

A file accumulates, becoming quite large, of citations and sources for further culling and search.

Acquisition is made more selective, and balanced with special effort to obtain samples of all desired topics

Specialized requests are prepared for searches, specific citations and abstracts from the data services.

Selected foreign language materials are earmarked and acquired.

For the 1000 (approx) items in this report, about 50,000 papers were seen directly, and bases totalling over 10 mill were searched.

### Search Terms

To recover desired citations from several data banks used (NLM Medline, NASA Recon, NIH Grants, NIOSH, EPA, DTIC, NTIS) and the libraries, the concepts defining the field here must be redrafted in the language and search structural form for each system. In the limit, in some systems the wrong queries will get unsatisfactory or no responses. After preparing sets of terms for each system, these were merged into a composite which could be used (in part) for a number of search entries. About 100 terms comprise this set.

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0003
4. TITLE (and Subtitle) Physiological and Performance Measurements in Simulated Airborne Combined Stress Environments		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Bowman JS, Von Beckh HJ		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Nav Air Dev Ctr, Aircr & Crew Systems Unit, Warminster PA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NM RWU MF51524005
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 4P 15R
14. PUBLICATION Aviat Space Environ Med 1979 (Jun);50:604-608		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments on the NADC Dynamic Flight Simulator, human subjects (4 trained 7 wks, in flight clothing) were exposed to: ACCELERATION, up to 1.03 Gz for 2.5 min, then patterned maneuver-like changes (ACM) of 3-5Gz for 10-20 sec, with return to 1.03 Gz for 2.5 min rest, repeated in 6 cycles in 160+ sec, with exposure pattern in each 1 hr repeated 6 times. Seat positions tried included 15, 30, or 60°; VIBRATION (V) buffet at 0.2 Gz peak, and 10 Hz, in the several seat back positions: SOUND (S), at 85 dba, frequency not given; HEAT, to 48-51° C; LIGHT LEVEL on instruments, 1 Lux or none. Tasks were: 2-axis tracking with RH side control and attitude/direction-indicator display; response time with peripheral light to be switched off. Two-five stresses were always present. In maneuver, there is increase in tracking error, response time, heart rate, fatigue, and no changes in biochem. Gz + buffet reduce tracking pfmcce.		
19. KEY WORDS acceleration, vibration, sound, heat, lighting, combined stresses, tracking performance, maneuver, buffet, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO. ADA074857	3. CATALOG NUMBER A0049
4. TITLE (and Subtitle)  Heat and Acute Dehydration Effects on Acceleration Response in Man		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER SAM-TR-78-248
7. AUTHOR(s)  Nunneley SA, Stribley RF		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS AF Schl Aerosp Med Brooks AFB TX		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 4P 20R
14. PUBLICATION  J Appl Physiol 1979 (1);47:197-200		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (7 M ages 22-39 yr, fit) were exposed to: DEHYDRATION done by HEAT loading, to lose water, with T <sub>core</sub> kept at 30-38.5° C by immersion in bath at 41.5° C or air at 40° C, with T <sub>core</sub> then lowered to 22° C at rest for 60 min before next stressor, ACCELERATION, on AF SAM centrifuge, applied at two conditions: to subject wearing suit in capsule preheated to 38° C, or at 20° C. Two series of runs were made: "relaxed runs", with 2Gz for 1 min, then 3 Gz for 1 min, then rise at 1 Gz/sec to Gz limit; or "pressure runs", with 7 Gz for 1 min with activated anti-G suit and Valsalva maneuver (bearing down with closed glottis). Heat alone reduces G tolerance 0.4 Gz. Dehydration reduces G tolerance and yields an increased variability in responses to heat. Dehydration further enhances effect of G on heart rate increase and loss of blood vol, and interferes with anti-G reflexes, especially in rapid maneuvers.		
19. KEY WORDS dehydration, heat, acceleration, combined stresses, core temperature, centrifuge, Valsalva maneuver, anti-G suit, anti-G reflexes		
20. NOTES		

PHYSICAL/PHYSICAL  
COMBINED STRESS EXTRACTS

APPENDIX A

EXTRACTS OF SELECTED  
COMBINED STRESS REPORTS

## 7. REFERENCE MATERIAL

APPENDIX A      EXTRACTS OF SELECTED COMBINED  
STRESS REPORTS

APPENDIX B      SUPPLEMENTAL BIBLIOGRAPHY 1

APPENDIX C      SUPPLEMENTAL BIBLIOGRAPHY 2

## 6. RECOMMENDATIONS

The search and analysis on work in a number of special areas must be extended and expanded:

- for human studies, in the Western literature, for all variables, especially those for which animal work now dominates the scene, and for chemical/physical pairs in the workplace setting, in which the Soviet literature is largely represented.
- for animal studies, for all variables, for a number of species especially higher mammals, and for studies which try to link animal models quantitatively with human response for combined stresses.
- modulator factors work, where it is consciously designed in as a controlled part of a study; also data on limitations of work performance produced in various contexts by smoking, illness and fitness, prescription and OTC drugs, ethanol, nutrition, etc.
- examination of the work programs in combined stresses at about 100 presumed productive sites, and determination of "who knows and what" as well as obtaining current work images.
- examination of the report literature, by arranging for access and availability, including to restricted installations (this work can be further protected in analysis and publication); specific link to Navy programs.
- search for validation trial data (first from NIOSH and NIEHS) establishing kinds of criteria used for trial candidate selection, protocols, worksites and sponsors, Especially emphasize longer-term effects.

Evaluate ways to improve communications in the technology of combined stress studies: continuing surveillance over the field, possible newsletter, workshops and periodic meetings, sensitization of analysts at DTIC, NTIS, NLM including preparation of a CS thesaurus, participation in an occupational health clearinghouse, etc.



Generally, the journal articles selected here (peer reviewed and available anywhere) provided limited data to describe or verify statistic design or inference, dose conditions, or describe defensibly interactive response events or mechanisms. The report literature (from research contractors, Govt labs) when available, offers a freer and more copious range of information (albeit as good, if it derives from peer reviewed grants and nationally known labs). It may have much of the above desired information, plus data on method, speculations on mechanism, and discussions at length on problems-

No mechanism for exchanging information in this combined stress field exists. There is no formal communication between active sites, no continuing surveillance.

## 5. CONCLUSIONS

The journal disclosures on stressor pairs extracted here cover most of the combinations regarded as important (see matrix in this report).

There is an imbalance in the number of human studies reported in journals, compared with animal experiments, which dominate the literature. Little attempt is made to relate these combined stress data to human responses, except by dose-scaling and assumptions of additivity of known single variable responses.

Modulating factors are generally casually handled, except when they are formally part of the stressor set designed into the experiment. Nutrition, medication, drink, concurrent illness, smoking are modulators of main responses.

There is a pool of laboratory and study sites, which includes those from which the extracts have been drawn, and also a much larger group of presumably productive locales (up to 100 in U.S.). These have not been polled to learn of their activities on combined stress study.

There was no significant discussion in these experimental papers, of any rationale for modifying present exposure limit values rooted in single variable stressors, to accommodate data on interactive responses to combined stresses.

The work reported here (with a few self-evident exceptions) deals with research findings, which are considered only as suggestive until conclusively validated in some controlled study (counterpart of medical clinical trials).

	SOUND	VIBRATION	ACCELERATION	HEAT	COLD	HI-PRESSURE	LO-PRESSURE	ION-RAD	NON-ION-RAD	GAS, VAPOR	PARTICLES	METALS	SOLVENTS	DRUGS	MISC CHEM
SOUND	X		X				X		X	X	X	X		X	X
VIBRATION	X	X	X	X	X	X	X			X	X	X	X	X	X
ACCELERATION				X	X		X	X						X	
HEAT						X	X	X	X	X	X		X	X	X
COLD						X	X	X		X				X	X
HI-PRESSURE								X		X			X	X	X
LO-PRESSURE								X		X			X	X	X
ION-RAD										X	X		X	X	X
NON-ION-RAD														X	X
GAS, VAPOR										X	X	X	X	X	X
PARTICLES												X	X	X	X
METALS												X	X	X	X
SOLVENTS													X	X	X
DRUGS														X	X
MISC CHEM															X

Figure 1. Stressor Pairs in Recovered Citations

Non-interactive events: independent, non-contingent, perhaps different sites, different modes of injury, interchangeable responses (2 insecticides, stomach or contact toxin).

Interactive events:

Additive, where there is parallel responsiveness, eg where dose-response regression lines are parallel, doses may be substituted, actions may be at the same target, summing of stimuli may be done algebraically additively.

Synergistic, supra-additive,  $2+3=22$ , multiplicative, cooperative (Example:  $\text{CCl}_4$  and/or ethanol in liver injury)

Antagonistic, infra-additive,  $7+8=11$ , inhibitory, competitive, (eg anti-oxidant effects, Se & Hg). Functional antagonism, may be push-pull (eg barbiturates vs vasopressors); chemical (dithiopropanol BAL vs Pb or radiation); dispositional antagonism (competing at sites of absorption, metabolism)

Potentiation, one may have no effect but influences the other,  $0+2=16$  (isopropanol +  $\text{CCl}_4$  effect on liver, etc)

#### 4. RESULTS

Over 300 extracts of selected combined stress papers will be found in Appendix A where they are grouped by major topics such as all-physical stresses, physical + chemical stresses, etc.

About 500 citations are displayed in the two supplementary bibliographies in Appendices B and C. For many, the papers have been hard to obtain (foreign sources or report literature with restricted access). Some are variants on papers already extracted in the set in App A. Nearly all are worthy of further analysis, requiring effort beyond the level afforded by this brief study.

Extent of coverage of possible combinations of stressor pairs is summarized in the matrix of stressor pair which follows. These combinations go beyond heat/noise/selected chemicals and were recovered incidental to the sweep of the main searches because of the possible insights into the data on interactive events.

About 80% of the reports describe animal studies, and 18% human studies. About 10 animal species are discussed. Many papers report on such modulating factors as smoking, nutrition, drugs, alcohol etc.

Response data, on events from biochemical through behavioral, for the single then combined stresses, generally do not refer to the fact of interaction, its measures, modes or mechanisms. Whether at the study's environmental level (physical interactions between particles such as dust/MgO and SO<sub>2</sub>/NH<sub>3</sub>/acrolein, or chemical, eg forming smog), or interactions at point of entry into organism or in its pharmacokinetic absorptions, transport, transformations, disposals; terms may be applied, casually, with local meaning only in that report (synergy, antagonism additive, etc). The definitions briefly stated below, generally accepted, may be used in looking at these papers:

AUTHOR \_\_\_\_\_ CODEN \_\_\_\_\_ INIT/DATE \_\_\_\_\_ P \_\_\_\_ of \_\_\_\_

MODIFIERS cigs \_\_\_\_\_ alc \_\_\_\_\_ (0)sleep \_\_\_\_\_ drug(name) \_\_\_\_\_

diet \_\_\_\_\_ age \_\_\_\_\_ fit/ill \_\_\_\_\_ other envir \_\_\_\_\_

ENVIRONMENT work(kind&task) \_\_\_\_\_ lab \_\_\_\_\_

public vehicle \_\_\_\_\_ bldg \_\_\_\_\_ street \_\_\_\_\_ home \_\_\_\_\_

SUBJECTS anim(spec) \_\_\_\_\_ human \_\_\_\_\_ ages \_\_\_\_\_ number \_\_\_\_\_ fitns \_\_\_\_\_

oprtr/partcpt \_\_\_\_\_ subjct \_\_\_\_\_ patient \_\_\_\_\_ casual obsvr \_\_\_\_\_

EXP DESIGN controls \_\_\_\_\_ stat param \_\_\_\_\_

epidem survy \_\_\_\_\_ tol.stds(name/source) \_\_\_\_\_

RESPONSE DATA

System path(see list) \_\_\_\_\_

Biochm/met path \_\_\_\_\_

Behavior/pfmce events \_\_\_\_\_

Respse Immed \_\_\_\_\_ Delayed \_\_\_\_\_ Acute \_\_\_\_\_ Chronic \_\_\_\_\_

Tolerances Exceeded(MAC,TLV) \_\_\_\_\_

Remarks \_\_\_\_\_

COMBINED RESPONSE CONCLUSIONS, AUTHORS'

independent \_\_\_\_\_ additive \_\_\_\_\_

"synergistic" \_\_\_\_\_ multiplicative \_\_\_\_\_ potentiated \_\_\_\_\_

antagonistic \_\_\_\_\_ competitive \_\_\_\_\_ compensatory \_\_\_\_\_

other non-linear \_\_\_\_\_ bases for conclusions & mechanisms \_\_\_\_\_

QUALITY(1-5hi)adequ data \_\_\_\_\_ adequ controls \_\_\_\_\_

rept relevance \_\_\_\_\_ sound conclus \_\_\_\_\_

insight into combd \_\_\_\_\_ QI(total,to 25) \_\_\_\_\_

COMBINED STRESS WORKSHEET

P \_\_\_\_ F \_\_\_\_

AUTHOR \_\_\_\_\_ CODEN \_\_\_\_\_ INIT/DATE \_\_\_\_\_

-----  
STRESSOR VARIABLES

CHEM #1 Name \_\_\_\_\_ Phase \_\_\_\_\_

Dose-Conc(mg/Kg/time or mg/m<sup>3</sup>,ppm) \_\_\_\_\_ Route \_\_\_\_\_

Range,Steps \_\_\_\_\_ Time Pattern \_\_\_\_\_

Cum.Dose \_\_\_\_\_ Remarks \_\_\_\_\_

CHEM #2 Name \_\_\_\_\_ Phase \_\_\_\_\_

Dose-Conc \_\_\_\_\_ Route \_\_\_\_\_

Range,Steps \_\_\_\_\_ Time Pattern \_\_\_\_\_

Cum Dose \_\_\_\_\_ Remarks \_\_\_\_\_

CHEM #3 Name \_\_\_\_\_ Phase \_\_\_\_\_

Dose-Conc \_\_\_\_\_ Route \_\_\_\_\_

Range,Steps \_\_\_\_\_ Time Pattern \_\_\_\_\_

Cum Dose \_\_\_\_\_ Remarks \_\_\_\_\_

PHYS #1 Name \_\_\_\_\_ Direction \_\_\_\_\_

Dose-Rate \_\_\_\_\_ Route & Cplg \_\_\_\_\_

Freq & Spectrum \_\_\_\_\_ Time Pattern \_\_\_\_\_

Cum Dose \_\_\_\_\_ Modulation \_\_\_\_\_

PHYS #2 Name \_\_\_\_\_ Direction \_\_\_\_\_

Dose-Rate \_\_\_\_\_ Route & Cplg \_\_\_\_\_

Freq & Spectrum \_\_\_\_\_ Time Pattern \_\_\_\_\_

Cum Dose \_\_\_\_\_ Modulation \_\_\_\_\_

STRESS COMBINS:Names, Doses, Pattern(simul or consec) \_\_\_\_\_

## Processing of Acquired Literature

### Citations Handling

Control numbers were assigned to citations, reprints, and worksheets. Citations without reprints at hand were kept in a separate author file for search and dupe check.

### Reprints Handling

A reprint is kept for every document analyzed, and in the groups reported here, eg physical, physical and chemical, particles....etc.

### Analysis and Extraction

Stress pairs from each paper were entered into the matrix illustrated in this report, but kept here in more detail. A combined-stress analysis form (like the attached sample) and a worksheet accompanied each. Papers were screened again for relevance and quality, then an extract was prepared (containing salient data as available in the report on the stressor variables, subjects, environment, treatments, responses, data and comments on interactions. The final entries of extracts and citations were made on a modified version of the DD1473 form (now allowing full display of extract on face page), and removing clutter on classification, etc.) See Appendix A for these forms.



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0224
4. TITLE (and Subtitle) The Effects of Sustained Acceleration, Airframe Buffet, and Aircraft Flying Qualities on Tracking Performance		5. TYPE OF REPORT & PERIOD COVERED abstract
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Piranian AG		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Air Devel Ctr Warminster PA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 1P no R
14. PUBLICATION  Aviat Space Environ Med 1976 (Apr);47:458 (abstract)		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments on NADC centrifuge, human subjects (pilots) were exposed to: ACCELERATION to 5 Gz, sustained; VIBRATION, as buffet, to 0.5 Gz; and FLYING QUALITIES changes, with altered stability, maneuverability, controllability, responsiveness if simulated aircraft. Tracking tasks were scored for 17. air-air miss distance, and % time within fixed radius of target. Pilots rated "flying qualities" as the dominant feature in tracking performance, but the presence of sustained Gz was significant in altering tracking performance. Buffeting Vibration Gz had negligible effect on performance. 18.		
19. KEY WORDS acceleration, vibration, buffeting, flying qualities, combined stresses, tracking, pilotage, maneuver, interactive responses		
20. NOTES Paper 74-793 pres AIAA Conf Mechanics and Control of Flight, Anaheim CA Aug 1974		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0111
4. TITLE (and Subtitle) Heat and Simulated High Altitude: Effects on Biochemical Indices of Stress and Performance		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER ARIEM-N-18/76
7. AUTHOR(s) Francesconi RP, Fine BJ, Kobrick JL		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Army Res Instit Envir Med Natick MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 5P 32R
14. PUBLICATION Aviat Space Environ Med 1976 (5);47:548-552		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (5 M 19-21 yr) were exposed to: HEAT, 35°C and 90% RH; HYPOBARIA, 4300 Meters. Treatments in a pattern of 7 hrs of continuous exposures, over 4 days, included: simulation of sea level hot wet climate, 35°C and 90% RH; and altitude, 4300 M and moderate temp. 22-23°C. 17. Tasks included: translating code, slide rule use, work with metro data. After 7 hrs exposure to heat, there were rises in plasma cortisol, dopamine-beta-hydroxylase, uric acid, with no effect on cAMP and cholesterol. After 7 hrs exposure to altitude, there were no changes in biochemical factors. Heat or altitude elicited 18. different biochemical responses, but produced similar performance decrements. Heat + high altitude induce changes not seen with single stresses, in factors such as ACTH		
19. KEY WORDS heat, hypobarica, combined stresses, biochemical indicators, task performance, plasma enzymes, hormones, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0039
4. TITLE (and Subtitle)  Effects of Hypoxia, Heat, and Humidity on Physical Performance		5. TYPE OF REPORT & PERIOD COVERED  Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Lahiri S, Weitz CA, Milledge JS, Fishman MC		8. CONTRACT OR GRANT NUMBER(s)  G: NIH HL-8805 G: WHO SOH-088-1968
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Univ Penna Schl Med Dept Physiol, Phila; INDIA:Christian Med Coll. Vellore		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE  1976
		13. NUMBER OF PAGES AND REFS  5P 15R
14. PUBLICATION  J Appl Physiol 1976 (Feb);40:206-210		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT  In a field experiment in Nepal, human subjects (66 born at sea level and acclimatized 4 wk at 3800 M, and 24 Highlanders including 16 Sherpas born and raised at 3800 M) were exposed to: HYPOXIA (H) the pO <sub>2</sub> present at altitude 3800 M (in a climate of moderate temperature and humidity), or HEAT (values not given) present with humid conditions at sea level. 17 In the hot humid sea level environment physical performance capacity was limited, and becomes as incapacitating as in the hypoxic environment at altitude. Both kinds of events are mediated through the cardiovascular system, with the degree of physical strain experience related to physical conditioning or acclimatization. Maximum heart and ventilation rates, and O <sub>2</sub> uptake in the untrained may be reached at low work rates (eg in step test).		
19. KEY WORDS  hypoxia, heat, altitude, physiological performance, acclimatization, conditioning, cardiovascular performance, mountaineering, oxygen uptake, work capacity, ventilation rate		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0299
4. TITLE (and Subtitle) Cross-Adaptation in Military Trainees in a Hot Climate		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Hale HB, Williams EW, Ellis JP Jr		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USAF Sch1 Aerosp Med Brooks AFB TX		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 6P 21R
14. PUBLICATION  Aerosp Med 1972 (9);43:978-983		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments and field observation, human subjects (military trainees) were exposed to: THERMAL STRESS, range from -10°C to +35°C ambient; HYPEROXIA, from 21%-100%. Treatments, considered against control data from trainees in summer and winter field scenarios, included: baseline exposure at 25°C for 4 hr; hyperoxia alone, 100% O <sub>2</sub> at 1 atmosphere; cold alone, -10°C to +15°C, with temperature pulsed in at start of hr 3 of 4 hr period, and last hr is recovery; heat alone with 10°C rises in pulse form to 35°C; 100% O <sub>2</sub> + cold, +15° C applied in pulse form; and 100% O <sub>2</sub> + heat, +35°C heat pulse. In heat adapted trainees, basal metabolic rate falls; during acclimatization metabolic rate first goes up. The heat-adapted show only limited physiological change. In the cold, heat adaptation leads to cross-adaptation. Hyperoxia augments adaptive change.		
19. KEY WORDS cold, heat, hyperoxia, physical training, acclimatization, cross-adaptation, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0272
4. TITLE (and Subtitle) Heat Stroke		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Shibolet S, Lancaster MC, Danon Y		8. CONTRACT OR GRANT NUMBER(s) G: NIH NLM Internat Pgm
9. PERFORMING ORGANIZATION NAME AND ADDRESS ISRAEL: Tel Hashomer Hosp, Heller Instit Med Res. Tel Aviv; USA: AF Schl Aerosp Med Brooks AFB TX		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 22P 270R
14. PUBLICATION Aviat Space Environ Med 1976 (3);47:280-301		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT This review discusses the multiple factors involved in the heat stroke syndrome. Topics include: modes of induction (active and passive); epidemiology; physiopathology and mechanisms (discussed as cases and findings), including malignant hyperthermia, dehydration, CNS changes (edema, irritability, cerebellar syndromes, coma), CV changes, hemostasis, proteinuria, GI symptoms (diarrhea, vomiting, jaundice), clinical heat cramps; also diagnostic methods; treatments and prevention (including rapid cooling, prophylactic antibiotics, rest, hydration).		
17.		
18.		
19. KEY WORDS heat stroke, combined stresses, hot climates, hyperthermia, dehydration, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0107
4. TITLE (and Subtitle) Hypoxia and Shivering Thermogenesis in Cold Acclimatized Miniature Pigs		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Blatteis CM, Gilbert TM		8. CONTRACT OR GRANT NUMBER(s) G: PHS FR-5243
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Tenn Med Schl Dept Physiol, Memphis		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 4P 16R
14. PUBLICATION J Appl Physiol 1974 (Apr);36:453-456		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, minipigs (4, cold acclimatized) were exposed to: COLD (C), at 7°C for 2 hr, or 25°C for 30 min; HYPOXIA (H), with 10% O <sub>2</sub> in N <sub>2</sub> total sea level pressure; and NOREPINEPHRINE Bitartrate (N), 2 ug/kg/min iv for 20 min. Treatments involved various combinations of these. Hypoxia reduced metabolic responses to cold in sensitive species, due to effects on heat production mechanisms (non-shivering thermogenesis). N increased O <sub>2</sub> consumption and rectal temperature in normoxic but not hypoxic animals. Cold also increases O <sub>2</sub> consumption in normoxic and hypoxic animals.		
17. KEY WORDS hypoxia, cold, hormones, combined stresses, norepinephrine, thermogenesis, metabolism, acclimatization, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0274
4. TITLE (and Subtitle) Thermogenic Processes during Cold in Hypoxia		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Blatteis 'CM		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Res Instit Envir Med Natick MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1966
		13. NUMBER OF PAGES AND REFS 4P 21R
14. PUBLICATION Fed Proc 1966 (7-8);25:1271-1274		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, dogs (31 mongrel, adult, postabsorp- tive, unanesthetized) were exposed to: COLD (C) at 60C or 260C; HYPOXIA with 12% O <sub>2</sub> in N <sub>2</sub> at sea level pressure (O); or HORMONES (H) epinephrine or norepinephrine 2 ug/kg/min iv 10 min. Treatment included: T6 3 hrs; T6 + O <sub>2</sub> -12; or T6 + O <sub>2</sub> -12 or H(Ep); all in various combinations. Low temperature alone increased (sustained) O <sub>2</sub> consumption, rectal temp., glucose, FFA. Low temp. + hypoxia did not change oxygen consumption, abolished rises in T <sub>rect</sub> which kept falling, and there was no change in FFA, glucose. Hypoxia induced a decrease in body heat content, after reduced heat production and initially reduced O <sub>2</sub> consump- tion (which rose after 50 min to pre-hypoxic values). Hypoxia reduced cold-induced increase in O <sub>2</sub> consumption. With H (ep) infusion, O <sub>2</sub> use rose over 15 min period; norep caused a similar rise. O + H (ep) smaller O <sub>2</sub> use rise than ep alone, back in 15 min		
19. KEY WORDS cold, hypoxia, hormones, combined stresses, epinephrine, norepinephrine, metabolism, thermogenesis, oxygen consumption, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0025
4. TITLE (and Subtitle) Effect of Chronic Exposure to Cold, Hypoxia, and Both Combined on Water Exchange in Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Fregly MJ, Lutherer LO, Tyler PE		8. CONTRACT OR GRANT NUMBER(s) C: ONR N14-68-A-0173-7
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Fla Coll Med Dept Physiol, Gainsvll.		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 8P 39R
14. PUBLICATION Aerosp Med 1974 (Nov);45:1223-1231		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (24 M) in metabolic chamber, were exposed to: COLD at 5°C; HYPOXIA, with 14% oxygen in nitrogen at normal pressure. Treatments included: 14% O <sub>2</sub> ; 5°C; O <sub>2</sub> (14)+T(5); with 30 day exposures. At a given water intake, all test groups produced more urine than controls. Cold + hypoxia do not show a summation of responses produced by each, for serum osmolality, post-environment drinking, water intake and urine output. Cold + hypoxia can increase metabolic rate, at a reduced response compared with cold alone. Speculations consider a complex endocrine interaction. But at 28 day when pitressin was used to test concentrating ability of the kidney, this failed to have an effect in reducing urine output in cold or cold-hypoxia treated animals.		
17. KEY WORDS cold, hypoxia, combined stresses, water balance, diuresis, kidney concentrating ability		
18. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO. ADA078307	3. CATALOG NUMBER A0118
4. TITLE (and Subtitle) Cross-Adaptive Effects of Cold, Hypoxia, or Physical Training on Decompression Sickness in Mice		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER NMRI-79-66
7. AUTHOR(s) Rattner, BA, Gruenau SP, Altland PD		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Med Res Instit Bethesda MD (BAR, SPG) NIH NIAMDD Lab Chem Phys, Bethesda		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NM RWU MRO41.01.003.0148
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 5P 28R
14. PUBLICATION  J Appl Physiol 1979 (2);47:412-417		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, mice (M swiss) were exposed in 2 studies to: COLD (C) to 4° C continuously; HYPOBARIA AND HYPOXIA (P) at 379 Torr (0.5 atmo); and HYPERBARIA (H) to 7.6,8.8,9.9, and 11.1 ATA. In one treatment of 28 days: T4 for 4 hr; then P½ for 4 hr; then treadmill exercise 2 25-min sessions with 5 min rest; then swim for 15 min at 31° C. On day 28 subjects were exposed for 24 hr in decompression chamber in various sessions to H 7.6-11.1 ATA for 30 min, then rapidly decompressed to 1 ATA. Survivors were counted after 30 min. Treatment 2 (14 days): P½ for 4 hr; treadmill 3 25 min sessions, with 5 min rests; 18. compression to 1.3 ATA with pO₂ of 0.5 ATA, then H at 1.8 atmo/m to desired peak ATA, held 30 min, then decompressed to 1 atmo. Decomp.tolerance is not affected by cold exposure or swimming. Treadmill raised decomp tol.;P reduced tol.to decomp.		
19. KEY WORDS cold, hypobaria, hyperbaria, combined stresses, exercise, compression, decompression, tolerance, cross-adaptation, altitude, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0221
4. TITLE (and Subtitle) Effect of Breathing High Oxygen Mixtures on Metabolism during Shivering		5. TYPE OF REPORT & PERIOD COVERED abstract
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Kottke FJ, Phalen JS, Visscher MB		8. CONTRACT OR GRANT NUMBER(s) G: Munsingwear Fund of Minn Med Fdtn
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1944
		13. NUMBER OF PAGES AND REFS 2P no R
14. PUBLICATION Fed Proc 1944;3:26-27 (abstract)		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments (limited data are provided). human subjects were exposed to: COLD in chamber; and HYPEROXIA. With cold, shivering was not necessary for metabolic rate increase, although it augmented metabolic rate. Cold and hypoxia inhibit shivering, but metabolic rate is up as much as 14% here. 17 A variety of combined effects are suggested.		
18.		
19. KEY WORDS cold, hyperoxia, combined stresses, shivering, thermogenesis, metabolism, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0329
4. TITLE (and Subtitle) Effect of Breathing Oxygen at One Atmosphere on the Response to Cold in Human Subjects		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Froese G		8. CONTRACT OR GRANT NUMBER(s) G;Def Res Bd
9. PERFORMING ORGANIZATION NAME AND ADDRESS CANADA: Univ W Ontario Lab Biophys London Ontario		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1958
		13. NUMBER OF PAGES AND REFS 9P 12R
14. PUBLICATION J Appl Physiol 1958 (1);13:66-74		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (10) were exposed to: COLD, at 10° C and 25° C; and HYPEROXIA, at 100%. Oxygen alone vs air showed no change in O <sub>2</sub> consumption. At low T, when on O <sub>2</sub> , a decrease in O <sub>2</sub> consumption occurs (to 30% of the increase in O <sub>2</sub> consumption in the cold). There is also lowered heart rate, respiratory frequency, minute volume, EMG. It is speculated that this drop in O <sub>2</sub> relative to air may be a central reflex event, since the normal response to cold would include an increase in O <sub>2</sub> use, respiratory rate, etc). 17. 18.		
19. KEY WORDS cold, hyperoxia, combined stresses, oxygen consumption, metabolism, pulmonary function, EMG, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0305
4. TITLE (and Subtitle) Effect of Oxygen Inhalation on Cold Thresholds		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) MacCanon DM, Resnik J		8. CONTRACT OR GRANT NUMBER(s) G:AMRDC-DA-MD-49-193-62-G43 G:NIH-HE-K3-13,433-C1
9. PERFORMING ORGANIZATION NAME AND ADDRESS Chicago Med Schl Div Cardiovasc Res		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1963
		13. NUMBER OF PAGES AND REFS 4P 16R
14. PUBLICATION J Appl Physiol 1963 (6);18:1057-1060		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (11 M 23-26 yr, healthy) were exposed nude to: HYPEROXIA (O) at 100% via mouthpiece; and COLD (C) or HEAT (H), at 22.4-26.5° C or 36.6-39.3° C. Tests were made of cold threshold 30 min after breathing O <sub>2</sub> with exposure of a 50 cm <sup>2</sup> chest area to a dry ice shutterbox 17. radiant stimulus. At warm ambient T, any O <sub>2</sub> effect on threshold is independent of that reflex vasoconstriction which would be found in a cool environment. O <sub>2</sub> inhalation raises perceptual threshold for cutaneous cooling. Cool environments raise threshold. O <sub>2</sub> inhalation elevates tissue pO <sub>2</sub> , reduces chemoreceptor 18. tonic activity, and may alter the essential chemical metabolic nature of the cold sensing system.		
19. KEY WORDS hyperoxia, heat, cold, combined stresses, thermoreceptors, cold sensing, neural thresholds, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0331
4. TITLE (and Subtitle) The Effect of Breathing 15%, 21%, and 100% Oxygen on the Shivering Response of Nude Human Subjects at 10°C.		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER DRMI-RM-624
7. AUTHOR(s) Girling F, Topliff ED		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS CANADA: Defence Res Med Labs Toronto		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1966
		13. NUMBER OF PAGES AND REFS 5P 7R
14. PUBLICATION  Canad J Physiol Pharmacol 1966;44: 495-499		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (6 M) were exposed to: COLD, at 10° C up to 90 min; and OXYGEN (O), at 15,21,100%. Measurements were made of ventilation, oxygen, shivering. Response is very variable: degree of shivering goes up with time of exposure. The times to onset, then to severe shivering due to cold are increased by higher pO <sub>2</sub> .		
17. cold are increased by higher pO <sub>2</sub> .		
18.		
19. KEY WORDS cold, hypoxia, hyperoxia, combined stresses, shivering, ventilation, metabolism, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0284
4. TITLE (and Subtitle) Human Cardioaccelerative Responses to Hypoxia in Combination with Heat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Hale HB		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  AF Schl Av Med Brooks AFB TX		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1960
		13. NUMBER OF PAGES AND REFS 12P 7R
14. PUBLICATION  Aerosp Med 1960 (4);31:276-287		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects were exposed to: HYPOBARIA and HYPOXIA in ascents to 18,000 ft in chamber; and HEAT to 49°C. One Group (19 M, 25-30 yr) were decompressed in a heated chamber: T 49°C for 15 min, then ascent at 6000 ft/min to 18,000 ft, staying for 12 min. Group 2, exposed to hypoxia later 17 than heat, (5 M 30-45 yr) were heated to 49°C for 15 min, then exposed to O <sub>2</sub> -N <sub>2</sub> mix with pO <sub>2</sub> of 75 mm Hg (like 18,000 ft) but with total pressure at sea level. Exposures were to heat or heat + hypoxia or hypoxia 15 min after start of heat. Group 3 were exposed to hypoxia equivalent to 14,000 ft + 49°C heat; and 18. Group 4 were given hypoxic exposure + heat together for 45 min. 12/19 subjects decompressed to 18,000 ft without extra O <sub>2</sub> had induced greated heart rate compensation in heat. In 7/19, the heat is antagonistic, blocking changes in heart rate from hypoxia. Heat before/with hypoxia induces bradycardia, loss of vasc. tone		
19. KEY WORDS hypobaria, hypoxia, heat, decompression, combined stresses, bradycardia interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0045
4. TITLE (and Subtitle) Effect on Rate of Exposure to Heat and Vibration		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Megel H, Wozniak H, Sun L, Frazier E, Mason HC		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Boeing Co Aerosp Div Seattle WA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1962
		13. NUMBER OF PAGES AND REFS 4P 22R
14. PUBLICATION J Appl Physiol 1962 (5);17:759-762		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (200 M adult SD), in cages in environment chamber, were exposed to: VIBRATION, 17.5 G rms overall, flat from 100-500 Hz, with droops to 5 Hz and 800 Hz, direction not given but may be transverse in restrained subjects; also HEAT, with temps over range 26.7° C-46.1° C for 20 min; and treatments in various patterns of single or combined exposure. V increased hemoglobin, hematocrit, SGOT (20 min post exposure). This may be due to shift of fluid to extravascular spaces. H alone gave no changes in Hb, Ht, SGOT, at 20 min post exposure. V + H caused further increase (beyond V alone) in Hb, Ht, SGOT (at 20 min; 24 hrs later returns to normal); increased organ wts (heart, kidney, adrenal); and mortality at 2 hr post exposure to V + H is much greater than each acting separately. Synergies here may be best observed when single stressors are set close to lethal levels.		
17. KEY WORDS heat, vibration, combined stresses, blood volume, fluid balance, pathology, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0116
4. TITLE (and Subtitle) Effect of Altitude upon Tolerance of Rats to Vibration Stress		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Megel H, Wozniak H, Frazier E, Mason HC		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Boeing Co Aerosp Div Seattle WA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1963
		13. NUMBER OF PAGES AND REFS 3P 15R
14. PUBLICATION  Aerosp Med 1963 (Apr);34:319-321		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
17. EXTRACT In laboratory experiments, rats (130+ M adult SD) in cages in environment chamber, were exposed to: VIBRATION, 17.5 G rms overall, flat from 100-500 Hz, with droops to 5 Hz and 800 Hz, direction not given but may be transverse in restrained subjects; also, in another experimental condition, VIBRATION at 15 G peak at 60 Hz sine, random direction; or HYPOBARIA, at 0,5000,7500, 10,000, 14,000, and 18,000 ft. Treatments were: V60 + all altitude conditions; or V60 with 18,000 ft but 100% O <sub>2</sub> at sea level equiv; or Vrandom alone. No changes were seen due to V at sea level or V + P until 10,000 ft, then V tolerance dropped as function of altitude. At 14,000 and 18,000 ft mortality is increased. V + P (high alt but sea level O <sub>2</sub> ) has no effect, reduced pO <sub>2</sub> is the pri high alt factor. Vrand + P at 18,000 ft more deaths than V or P at 18,000 ft alone. V weakens lung structure, and contributes to death synergy: P 5%, V 8%, P + V 80%.		
18. KEY WORDS vibration, hypobaria, hypoxia, combined stresses, altitude tolerance, interactive responses		
19. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0352
4. TITLE (and Subtitle) Effect of Positive Pressure Breathing on Vibration Tolerance of the Mouse		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Brady JF, Newsom BD		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Gen Dynamics/Convair, San Diego CA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1966
		13. NUMBER OF PAGES AND REFS 6P 30R
14. PUBLICATION Aerospace Med 1966; 37:40-45		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, mice (153 M 32 wks, CFE) were exposed to: VIBRATION, 7.07 G rms, 20 Hz from shaker, for 10 min, with direction not given; and POSITIVE PRESSURE BREATHING (PPB) at 1.5-6.0" H <sub>2</sub> O into mask, as separate or combined stresses. V usually causes 70% mortality, with lung atelectases. V + PPB at eg 3.75" H <sub>2</sub> O yields scattered petechiae, but subjects otherwise normal. (Note that V max effects of thoracico-abdominal resonance at 4-8 Hz are not involved here). PPB protects lungs, etc. by reducing amplitude and intensity of pulmonary distortion. One can equate the V forces with the PPB compensatory forces.		
17. KEY WORDS vibration, positive pressure breathing combined stresses, lung pathology, biomechanical resonances, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0067
4. TITLE (and Subtitle) Vibration Syndrome in Forestry Commission Chain Saw Operators		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Taylor W, Pearson J Kell RL, Keighley GD		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS ENGLAND: Univ Dundee, Dept Social & Pvtv Med; Forestry Cmsn of Grt Brit		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1971
		13. NUMBER OF PAGES AND REFS 7P 17R
14. PUBLICATION  Brit J Indust Med 1971;28:83-89		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT An occupational health study found forestry workers (711 M incl 142 chain saw users) exposed to: VIBRATION, chain saw amplitudes over 80 micron (local allowable level), with major frequency of 125 Hz, and transfer through trigger handle orthogonal to chain bar. Exposures were 4-6 hr/day up to 10-12 yr. Concurrent exposure to COLD and SMOKING were considered, and questionnaire was used. Vibration syndrome (VS) damage to hands included blanched fingers, sensory loss, tremors, osteoporosis, joint cystic changes. VS prevalence in chain users was 44%, non-users 18%, function of length of exposure, and regionally different (high S. England, low in Scotland). 90% with VS had worked 10-12 yr. VS was affected by cold stress (chilling at work, travel), which may trigger established VS to produce symptoms, worse in winter. Smoking intensifies the effect and numbers in the VS groups.		
17. KEY WORDS vibration, cold, combined stresses, vibration syndrome, chain saws, vibrating tools, forestry, white finger, Reynaud's disease, sensory pathology, cardiovascular pathology, smoking, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0082
4. TITLE (and Subtitle) The Effect of Whole Body Vibration on Workers with Changed Reactivity (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Izrajlet LI, Alekseev EP, Bruvele MS, Mardere VL, Slinko VN, Khintsenberg YA		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Med Instit, Riga, Latvia, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE
		13. NUMBER OF PAGES AND REFS
14. PUBLICATION Gig trud (USSR) 1976 (2);12-15		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT Occupational health observations in a limited descriptive report, are provided about workers (165) in reinforced concrete and construction, in two groups: 1. Healthy, with normal immune system, and 2. Those with ALTERED IMMUNE STATE: allergies, increased cholinesterase activity, sinus arrhythmias, aspermia gynecological disorders, most attributed to reduced immune reactivity. These groups had occupational exposures to: VIBRATION, of 0.01-0.6 mm (and 0.11-10.0 cm/sec) at 5 Hz, with no other information, but probably from vibrating tools. Measurements were made of serum lysozymes and complement, passive hemagglutination reactions (eg tetanus and diphtheria antibodies), rbc latex sedimentation, etc. The signs of vibration syndrome were worse in those with immune deficiencies, as well as in those with aspermia, gynecological disturbances, cardiovascular and neurological deficiencies.		
19. KEY WORDS vibration, immune deficiencies, combined stresses, construction industry, vibration syndrome, allergy, aspermia, gynecological disorders, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0121
4. TITLE (and Subtitle) Vibration Sensitivity of Workers in Basic Occupations in Shipbuilding (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Yatsenko KS, Trubnikov GA, Afanasyev Y, Molokanov VM		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Med Instit, Astrakhan, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 3P 2R
14. PUBLICATION  Gig trud (USSR) 1981 (5);78-80		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT Occupational health observations of a limited descriptive nature are provided for workers (44 M, 86 F, 18-60 yr) in Naval shipyard jobs, in welding, painting, assembly. These combined stressor variables were examined: VIBRATION; SOUND (90-112 dbA of broad band noise); CHEMICALS, including ZN,Ti,Pb, also dyes and stains; DUST; FORCE and WEIGHT LOADS. Vibration sensitivities were impaired as a function of occupational exposure. In studies with a "vibrotester" at 63,125,250 Hz, impairment losses involved drops over 25 db. There were early findings of polyneuritis. No other data are given.		
17.		
18.		
19. KEY WORDS vibration, sound, chemical toxics, dust, sombined stresses, welding, painting, shipbuilding, metals, dyes, polyneuritis, touch sense, pressure sense, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0143
4. TITLE (and Subtitle) The Effects of Minimal Dehydration on Human Tolerance to Positive Acceleration		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Taliaferro EH, Wempen RR,, White WJ		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Douglas Aircr Co Biotech Dept Los Angeles CA		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  Aerosp Med 1965 (Oct);36:922-92C		12. REPORT DATE 1965
		13. NUMBER OF PAGES AND REFS 5P 6R
		15. SECURITY CLASS. (of this report)
16. EXTRACT In laboratory experiments, human subjects (8 M 21-29 yr, fit) were exposed to: DEHYDRATION with HEAT at 125° C 20-30% RH in chamber exposures for 2 hrs; and ACCELERATION, with onset and decay rates of 0.3 Gz/sec, and peak Gz held for 15 sec. First runs were peaked at 3.0 Gz, and 0.2 Gz increments for each run to blackout (with loss both of central and peripheral vision). Treatments were: Gz alone (with subjects); or non-experimental (controls) at room temp, given water ad lib, then Gz runs; or subjects in hot chamber 2 hr, down to room temp for 10 min, then ½ hr rest, then Gz. In another series, subjects in chamber with bouillion and water, then Gz; or lunch & water, then Gz. Gz + Dehyd (loss of 1-3% body wt) dropped Gz tol.(4.9 down to 3.5 Gz), as function of temp. Gz tol.was not lost if heated and hydrated. Related to changes in retinal blood flow and water balance		13. DISTRIBUTION
19. KEY WORDS acceleration, heat, dehydration, combined stresses, blackout, water balance, blood volume, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0106
4. TITLE (and Subtitle) Effect of Controlled Elevation of Body Temperature on Human Tolerance to +Gz Acceleration		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Allan JR, Crossley RJ		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS ENGLAND: RAF Instit Av Med Farnborough		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 3P 8R
14. PUBLICATION J Appl Physiol 1972 (Oct);33:418-420		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (6 19-36 yr, fit) were exposed to: ACCELERATION on centrifuge, Gz raised at 1 Gz/sec and held 15 sec at grayout threshold; HEAT and COLD pre-conditioning in this pattern: water immersion to reach 38.5° C core temp; immersion to 37.8° C core temp; normal core temp + skin vasodilation by using warm surface air; normal core temp and normal surface air; normal core temp + skin vasoconstriction by using cold surface air. The core temps were stabilized during G runs by wearing ventilation harness. It was found that one normal endpoint of 3.2 Gz dropped 0.9G at 38.5°C CT, dropped 0.5 Gz at 37.8° C CT, and fell 0.3 Gz at normal CT with skin vasodilation. The interactive additive effect is on the CV system		
19. KEY WORDS acceleration, heat, cold, combined stresses, core temperatures, skin temperatures, grayout, ventilation harness, immersion, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0275
4. TITLE (and Subtitle)  The Effect of Hypoxia on Tolerance to Positive Acceleration		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER NADC-MA-5905
7. AUTHOR(s) Burgess BF Jr		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  USN Air Dev Ctr, Av Med Accel Lab, Johnsville PA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1958
		13. NUMBER OF PAGES AND REFS 4P no R
14. PUBLICATION  Aerosp Med 1958 (10);29:754-757		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (4, trained) were exposed to: HYPOBARIA and HYPOXIA, in mixed conditions, with altitude of 16,000-21,000 ft, and oxygen at 9.5,10,10.5,11.0, 11.5, and 21.0%; and ACCELERATION, in 0.25 Gz increments, from 2.5 Gz in 12.5 sec to max Gz, held for 15 sec, with end point 17. peripheral light loss. Treatments included 4 sessions for each of the oxygen mixes and various altitudes with centrifuge runs from 2.5 Gz to PLL over 3 min total. Gz + hypoxia reduced tolerance 0.7-1.0 Gz, also with big changes in respiration, and dulling of perception. There was occasional simultaneous central 18. vision loss in 50% of subject runs at 4.5% and 10% oxygen. A wide variability in response was shown.		
19. KEY WORDS acceleration, hypobaria, hypoxia, combined stresses, altitude, grayout, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	2. CATALOG NUMBER A0333
4. TITLE (and Subtitle) The Effects of Time and Temperature upon Tolerance to Positive Acceleration		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Martin EE, Henry JP		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USAF Aeromedical Lab WPAFB OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1951
		13. NUMBER OF PAGES AND REFS 8P OR
14. PUBLICATION J Aviat Med 1951 (10);22:382-389		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (30 M trained) were exposed to: HEAT and COLD, from 15° C to 55° C air; or ACCELERATION, in range 1-5 Gz for 30 sec, 1 min, 2 min; unprotected or wearing anti-G suit (G4A). End point of tolerance was peripheral light loss. With G alone, applied to PLL end point, condition lasts about 6 sec, then reflexes provide recovery and a gain of 0.5 Gz more tolerance. Gz tolerance is reduced at 25° C (where there is cold, shivering). Gz tolerance is also reduced at 37° C (where subjects appear hot and sweating) but only 0.5 Gz less than effects of Gz + cold.		
17.		
18.		
19. KEY WORDS acceleration, heat, cold, combined stresses, grayout, anti-G suit, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0142
4. TITLE (and Subtitle) Dynamic Response of the Human Body to Vibration when Combined with Various Magnitudes of Linear Acceleration		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Vykukal HC		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS NASA, Ames Res Ctr, Biotech Div, Moffett Field CA		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  Aerosp Med 1968 (Nov);39:1163-1166		12. REPORT DATE 1968
		13. NUMBER OF PAGES AND REFS 4P 4R
		15. SECURITY CLASS. (of this report)
16. EXTRACT In laboratory experiments, human subjects (4 M 21-23 yr, fit) were exposed to: VIBRATION at $\pm 0.4$ Gz, over range 2.5-20 Hz sine, in 0.5 Hz increments, coupled into "semi-supine" seat; or ACCELERATION at 1,2.5,4.0 Gz, to "semi-supine" seat. No other data given. Mechanical impedance (magnitude and phase components) to vibration was measured. At accel. of 2.5 Gz vibration resonances were seen in range 9.5-12.5 Hz. Stomach vibration begins at 9.5 Hz and continues to 11.5 Hz. At 7, 11, 18 Hz pain and lowered tolerance to vibration is found. The Gz biases body dynamics, causing increased stiffness and high energy transmission to internal organs.		18. DISTRIBUTION
19. KEY WORDS acceleration, vibration, combined stresses, mechanical impedance, biodynamics, body resonances, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0127
4. TITLE (and Subtitle) Effects of Hypohydration on Work Performance and Tolerance to +Gz Acceleration in Man		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Greenleaf JE, Matter M Jr, Bosco JS, Douglas LG, Averkin EG		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NASA, Ames Res Ctr, Biotech Div, Moffett Field CA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1966
		13. NUMBER OF PAGES AND REFS 6P 33R
14. PUBLICATION Aerosp Med 1966 (Jan);37:34-39		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (9 M 21-29 yr) were exposed to: HYPOHYDRATION, with water reduction in 3 series; in wk 1 subjects given 1500 cc/day, in wk 2 ad lib water, in wk 3 900 cc/day, then on test day 6 given 200 cc water, 1 gm NaCl, and sustagen nutrient: also ACCELERATION on Ames 5 degree of freedom centrifuge at 3 Gz/min to grayout (usually about 5 Gz), with 3 runs and 1½ min between runs. Other tests of water tolerance were: motor treadmill, Harvard step test, isometric muscle strength, and blood chem, hematol, cardiovascular and neural measurements. Hypohydration to 4% made no change in tolerance to Gz, some exercise tests. if H is over 4%, there is loss of Gz tolerance, if H is 4-4.5% deterioration in step test, and change in O <sub>2</sub> use. Well conditioned subjects show no changes in 4-5 days; they may draw on a body pool of free circulating water(FCW).		
17. KEY WORDS hypohydration, acceleration, exercise, combined stresses, water balance, grayout, blood volume, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0297
4. TITLE (and Subtitle) Relationship of Sodium Deprivation to +Gz Acceleration Tolerance		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Shubrooks SJ Jr		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS AF Schl Aerosp Med, Brooks AFB TX		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 3P 7R
14. PUBLICATION  Aerosp Med 1972 (9);43:954-956		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (16 M 18-24 yr) were exposed to: ACCELERATION, in rapid-onset-runs (ROR) at 1 Gz/sec holding for 15 sec at peak tolerable Gz, or in gradual-onset-runs (GOR) with rise at 1 Gz/15 sec. End point was peripheral light loss; and SODIUM intake control, to levels of 10,50,100,150 mEq/24 hr, with K held at 100 mEq/24 hr and water to 2000 cc/24 hr and enough calories to maintain wt. With sodium reductions, plasma volume is reduced from 0-23%; Gz tolerance (ROR) drops 0.2-0.7 Gz and (GOR) 0.2-1.35 Gz, for all levels of sodium intake (10-150 mEq/24 h). There are large effects caused by small negative sodium and water balance changes; and even when baroreceptor reflexes have time to act with GOR, these can't hold cerebral blood flow at suitable levels.		
19. KEY WORDS acceleration, hyponatremia, combined stresses, blood volume, grayout, sodium deprivation, blood flow, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A006
4. TITLE (and Subtitle) The Effect of Temperature on Tolerance to Positive Acceleration		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER NADC-MA-5905
7. AUTHOR(s) Burgess BF Jr		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Air Dev Ctr, Av Med Accel Lab, Johnsville, PA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1959
		13. NUMBER OF PAGES AND REFS 4P 3R
14. PUBLICATION Aerosp Med 1959 (Aug);30:567-571		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (6) were exposed to: HEAT, 75° F (at 55% RH uncontrolled) to 160° F (90% RH) in pre- heated gondola for 20 min before G runs; and ACCELERATION, with rise to 2Gz, then up in 0.2 Gz steps until peripheral light loss. Peak Gz was reached in 7 sec, held at 15 sec, with final run in each series 4 min at 0.25 Gz below grayout. Repeat runs, with 3 min rest periods took 1 hr in gondola each series; there were 8 rides each at selected heat, daily, over 3 wk period. Heat reduced tolerance to Gz, without changes in response times per se until limit of heat exhaustion or poor coordination was reached. The lowest temp. to degrade Gz tolerance (by 0.2 Gz) was 100° F. For temp. alone, upper limit was 160° F, where skin temp was 102° F (and nausea, double vision, tachycardia at 170 beats/min occurred); here, a 1 Gz reduction in tolerance was found.		
17. KEY WORDS Acceleration, heat, combined stresses, centrifuge, grayout, heat exhaustion, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0053
4. TITLE (and Subtitle) Physical Factors of the Environment as a Hygiene Problem (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Shandala, MG		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Kiev Instit of Ger. & Commun Hyg USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 8P 23R
14. PUBLICATION Vestn Akad Nauk (USSR) 1981 (1);9-16		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT Brief description is provided on observational and laboratory studies at this institute, with allusion to the following factors as comprising a combined stressor ensemble: VIBRATION; SOUND (noise); ACCELERATION; ELECTRIC FIELDS, eg at 20 Kv/m; AIR IONIZATION; ELECTROMAGNETIC FIELDS (not described). 17. No statements are made about interactive responses.  18.		
19. KEY WORDS acceleration, vibration, sound, electric fields, electromagnetic fields, air ionization, combined stressors, interactive responses occupational hazards		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0351
4. TITLE (and Subtitle) Cold-Induced Thermogenesis in Dogs: Its Reduction by Moderate Hypoxia		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Blatteis CM, Lutherer LO		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Res Instit Envir Med Natick MA		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION J Appl Physiol 1973 (5);35:608-612		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 10P 38R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, dogs (12 M/F, 10-15 Kg, unanesthetized) were exposed to COLD (C) at 6° C and 26° C and HYPOXIA (H), 12%. Treatments were: C26 30 min with room air; C6 60 min with room air; C6 + H12. There is a hypoxic reduction of the thermogenic response to cold; the increase in O <sub>2</sub> use induced by cold in air is suppressed immediately by hypoxia, and gradually recovers with shivering. H causes no change in plasma glucose, lactate, pyruvate, FFA and ketones. Cold induces rise in FFA and ketones earlier in hypoxia than air; with limited O <sub>2</sub> to tissue, and ATP genesis reduced, FA oxidation is reduced and glucose accelerated. The reduced metabolic response to cold in hypoxia relates to impaired capacity to accelerate substrate oxidation rather than reduced substrate mobilization. Hypoxia suppresses part of the non-shivering thermogenesis component.		
19. KEY WORDS cold, hypoxia, combined stresses, thermogenesis, metabolism, FFA, shivering, hypobaria, altitude, interactive responses		
20. NOTES CMB 1973 to Univ Tenn Med Units Physiol & Biophys Dept LOL 1973 to Texas Tech Univ Schl Med Physiol Dpt, Lubbock		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0059
4. TITLE (and Subtitle)  Altitude and Hypoxia as Phase Shift Inducers		5. TYPE OF REPORT & PERIOD COVERED  Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Ashkenazi IE, Ribak J, Avgar DM, Klepfish A		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  ISRAEL: Tel Aviv Univ Sch Med, Dept Hum Genetics; and IAF Aeromed Ctr		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE  1982
		13. NUMBER OF PAGES AND REFS  5P 18R
14. PUBLICATION  Aviat Space Envir Med 1982 (Apr);53:342-346		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory experiments, human subjects (1F, 2M, 19-21 yr) were exposed in chamber simulation to: HYPOBARIA, to altitude of 25,000 ft for 30 min, with oxygen mask in place; starting with 30 min of denitrogenation, then to 5000 ft in 1 min, return to ground level, ascent at 5000 ft/min to 25,000 ft. Now, mask 17 was removed for 3 min to induce hypoxia, then descent at 5000/min to ground. Diurnal rhythms were found as reference in 24 plots of measured $T_{oral}$ , peak expir flow, grip strength, calculation and recognition tests. After exposure to combined stresses, shift in phase occurred concurrently in rhythms of several factors, 18. induced immediately after exposure, maintained for 4 days, then in incoherent ensemble reversed its shift. The report discusses possible oscillators and synchronizers in organisms.		
19. KEY WORDS  diurnal rhythms, altitude, hypoxia, combined stresses, rhythm phase shifts, internal oscillators, body temperature, hypobaria, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0261
4. TITLE (and Subtitle) Responses of Mountaineers to Multiple Stressors		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Morrison P		8. CONTRACT OR GRANT NUMBER(s) G: NIH-GM-10402
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Alaska, Instit Arctic Biol, Coll, AK		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1968
		13. NUMBER OF PAGES AND REFS 4P no R
14. PUBLICATION Arch Environ Hlth 1968;17:599-602		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT This discusses field observations made on winter 1967 ascent of Mt. McKinley (20,320 ft). This included initially 8 climbers, ages 23-39 yrs; 3 reached the summit. Exposures included: COLD to -42°F; HYPOXIA AND HYPOBARIA to 20,320 ft; WIND, causing chill and dehydration (data not given). Schedule was: 10 days 17 from 1500-14,400 ft, several days acclimatizing at 17,300 ft, 1 day to 19,000 ft, 1 day to summit at 20,320 ft, 7 days down to 18,200 ft, then 1 day down to base. No other data are given. They report observing extensive physiological change beyond acclimatization: dehydration, exhaustion, weight loss, lassitude, 18. LDH and CPK 2-5X normal (espec in cold injury), postural balance deterioration.		
19. KEY WORDS cold, hypoxia, combined stresses, mountaineering, Mt. McKinley, high altitude, wind chill, dehydration, fatigue, acclimatization, tissue enzymes, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0366
4. TITLE (and Subtitle) Effects of Lowered Body Temperature on Hyperoxic Seizures		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Giretti ML, Rucci FS, LaRocca M		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS ITALY: Univ Sassari, Sardinia Instit Human Physiol, Instit Clin Surg		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1969
		13. NUMBER OF PAGES AND REFS 6P 20R
14. PUBLICATION EEG Clin Neurophysiol 1969;27:581-586		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
17. EXTRACT In laboratory experiments, rats (90 SD) were anesthetized, then implanted with electrodes into frontal cortex dura, and thalamus. They were exposed to: COLD, to selected 15-35° C rectal temperature endpoint in 3-8 hr; and to HYPEROXIA (O) to 5 ATA in hyperbaric chamber. Hypothermia reduces electrical activity of cerebral cortex (at 21-25° C there are pre-epileptic spikes seen) but generally hypothermia in 15-35° C range stops appearance of hyperoxic seizures; and at 27-31°C the incidence and latency are reported to be like normals.		
18.		
19. KEY WORDS hyperoxia, cold, combined stresses, hyperbaria, hypothermia, seizures, neurologic syndromes. interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0302
4. TITLE (and Subtitle) Interactions of Increased pO <sub>2</sub> and pCO <sub>2</sub> Effects in Producing Convulsions and Death in Mice		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Marshall JR, Lambertsen CJ		8. CONTRACT OR GRANT NUMBER(s) C: ONR G: PHS-R-M692
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ of Penna Schl Med Dept Pharmacol Phila.		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1961
		13. NUMBER OF PAGES AND REFS 8P 22R
14. PUBLICATION J Appl Physiol 1961 (1);16:1-7		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, mice (379) were exposed to: HYPEROXIA (O) at 1-11 atmo.; and CARBON DIOXIDE (CO <sub>2</sub> ), 0-304 mm Hg in 38 combinations for 90 min periods. Endpoints were convulsions (first seizures) and death. O is convulsigenic over 3 atmo, and lethal over 4 atmo. CO <sub>2</sub> at various conc in 1 atmo of O is not con- vulsigenic, but is lethal at high pCO <sub>2</sub> . In O high pressure (OHP) addition of CO <sub>2</sub> shortens survival time, and small rises of CO <sub>2</sub> shorten preconvulsive periods, and is pCO <sub>2</sub> is over 120 mm, con- vulsions are inhibited. CO <sub>2</sub> decreases tolerance to high pO <sub>2</sub> , and high pO <sub>2</sub> increases toxicity of high pCO <sub>2</sub> . Low pCO <sub>2</sub> increases resistance to electroshock, but decreases resistance to OHP con- vulsions, an event reversed at pCO <sub>2</sub> in range 90-120 mm Hg. These are potentiation relations of OHP and pCO <sub>2</sub> .		
19. KEY WORDS hyperoxia, hypercapnia, carbon dioxide, combined stresses, neurologic syndromes, convulsions, interactive responses, potentiation		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0195
4. TITLE (and Subtitle)  Use of Oxygen for Optimizing Decompression		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Berghage TE, McCracken TM		8. CONTRACT OR GRANT NUMBER(s) NM WU-ZF51.524.014-0006
9. PERFORMING ORGANIZATION NAME AND ADDRESS  USN Med Res Instit Bethesda MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 10P 15R
14. PUBLICATION  Undersea Biomed Res 1979 (3);6:231-239		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (820 F albino) were exposed to: HYPERBARIA (P), to 10,25,40 ATA; HYPEROXIA (O) to 4.2 ATA; in 42 experimental conditions, with temperature held at 28° C. When O was raised to 4.2 ATA during P to 40 ATA, decompression was erratic, and O toxicity signs were found in CNS. There appears to be an increased sensitivity to O in He at raised pressures. An O envelope is defined as the range of elevated pO <sub>2</sub> usable to aid decompression; and optimum O level and envelope size depends on: ambient P & exposure time. At short shallow exposures, optimal O level is high. If O is too low, decompression sickness may occur, and if O is too high for the conditions, O toxicity may result.		
19. KEY WORDS hyperbaria, hyperoxia, combined stresses, decompression, oxygen, toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0250
4. TITLE (and Subtitle) Hypoxia and Oxygen Toxicity		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Fridovich, I		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Duke Univ Med Ctr, Biochem Dept Durham, NC		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 5P 21R
14. PUBLICATION Adv Neurol 1979;26:255-259		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT This brief survey discusses properties of oxygen which contribute to its toxicity in some conditions. A variety of dangerous reactive intermediates may be produced, in certain "minority pathways" of reaction (about 5% of total events). These may include, eg.: $O_2^-$ superoxide, $H_2O_2$ , OH hydroxyl radical. These may be produced under ordinary conditions in respiring cells. Defenses include superoxide dismutases, in all cells, which scavenge $O_2^-$ , yielding hydrogen peroxide (which catalases and peroxidases may deal with) and $O_2$ . In phagocytosis, in which bacteria can be engulfed without need for $O_2$ but can't kill unless $O_2$ is present, active intermediates may be produced, and these may be increased under hypoxia. After hypoxic events, damage may occur (eg in cerebrovascular problems) when normal reoxygenation is established and these substances accumulate.		
19. KEY WORDS hypoxia, oxygen toxicity, reactive intermediates, superoxides, hydroxyl radical, dismutases, phagocytosis, minority pathways		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0295
4. TITLE (and Subtitle) The Acute Hyperbaric Toxicity of Carbon Monoxide		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Rose CS, Jones RA, Jenkins LA Jr, Siegel J		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Toxicol Unit, Nat Nav Med Ctr Bethesda MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1970
		13. NUMBER OF PAGES AND REFS 9P 17R
14. PUBLICATION  Toxicol Appl Pharmacol 1970;17:752-760		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (NMRI-SD derived), mice (M NMRI), and guinea pigs (M Hartley) were exposed to: HYPERBARIA (P) at 25,50,75,100 psig; CARBON MONOXIDE (CO) to 6350 ppm, different levels for the various species; with oxygen maintained 140-160 mm by adjusting mix, in 4 hr study, with stepwise increases in P, then decompression with 79% He and 21% O <sub>2</sub> . In animals that died, the COHb levels and LC <sub>50</sub> values as function of pressure were set down. All animals were unconscious during hrs 1 and 2 with CO. There was no change in toxicity of CO in these species as total P increased up to 100 psig. The equilibrium % of COHb produced by a conc of CO was independent of environmental P.		
19. KEY WORDS carbon monoxide, hyperbaria, combined stresses, oxygen, toxicity, carboxyhemoglobin, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER
	ADA025563	A0324
4. TITLE (and Subtitle)		5. TYPE OF REPORT & PERIOD COVERED
Physiological Responses of Men Working in 25.5C Water, Breathing Air or Helium Tri-mix		Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
Hoar PF, Raymond LW, Langworthy HC, Johnsonbaugh RE, Sode J		
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
Nav Med Res Inst & Dept of Med, Natl Naval Med Ctr, Bethesda MD		USN BuMed Res Task 41566187X775 M4306 Med Res Pgm
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE
		1976
		13. NUMBER OF PAGES AND REFS
		6P 28R
14. PUBLICATION		15. SECURITY CLASS. (of this report)
J Appl Physiol 1976 (4);40:605-610		
		15a. DISTRIBUTION
16. EXTRACT		
<p>In laboratory experiments, human subjects (M, av age 34 yr, divers and diving officers) were exposed to: THERMAL STRESS, 25.5° C water immersion; and GAS MIXES; 35% He + 21% O<sub>2</sub> + 43% N<sub>2</sub> (trimix) at 3 M depth. Treatment sequence was: Water immersion, breathing air day 1, then either air or trimix day 2, with day order reversed for ½ the subjects. EXERCISE WORK was done, on ergometer, with 3 cycles of immersed work, 4 mins of rest, 6 min of work, then 4 min recovery cycles. Cold reduced T<sub>rect</sub> despite exercise, and contributed to increased O<sub>2</sub> use and catecholamine excretion. Immersion caused a skin vasoconstriction, and work and scuba breathing added to a brisk diuresis (with centralizing blood vol). Trimix yielded higher minute ventilation, but lower O<sub>2</sub> use than air. Trimix scuba breathing yielded a smaller diuresis. The fall in core temp during work in water was the same for air and trimix. Work and cold stress responses are modified by the trimix.</p>		
17. KEY WORDS		
helium gas mixes, cold, exercise, combined stresses, trimix, catecholamines, diuresis, scuba breathing, body temperature, oxygen consumption, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0334
4. TITLE (and Subtitle)  Pressure Resolves Two Sites of Action of Inert Gases		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Miller KW, Wilson MW, Smith RA		8. CONTRACT OR GRANT NUMBER(s) G:NIH-GM-15904 C:NMRDC-ONR-N14-75-C-0727
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harvard Med Schl, Depts Pharmacol & Anesthesia, & Mass Genl Hosp Boston		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 10P 54R
14. PUBLICATION  Mol Pharmacol 1978;14:950-959		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT <p>In laboratory experiments with mice, they were exposed to HYPERBARIA with Helium, up to 183 ATA, to study P effects on the potency of ANESTHETICS, including: N<sub>2</sub>O, CF<sub>4</sub>, SF<sub>6</sub>, N<sub>2</sub>, Ar, CCl<sub>4</sub>, hexafluoroethane, at various pressures and doses. Of interest was the ED<sub>50</sub> where beginnings of high pressure neurological syndrome would occur. Various signs: spasms, rhythmic tension and relaxation, altered righting reflexes were seen for different doses of N<sub>2</sub>O, N<sub>2</sub>, Ar, CF<sub>4</sub>. Pressure increased the ED<sub>50</sub> for loss of righting reflexes by 36% at 100 ATA for most of these. Sub-anesthetic partial pressures of all the gases raised the ED<sub>50</sub> pressure for spasms. It is suggested that 2 mechanisms apply: anesthetics work by expanding some hydrophobic phase critically, and hyperexcitability occurs when pressure reduces the volume of some hydrophobic phase by a critical amount.</p>		
19. KEY WORDS <p>hyperbaria, anesthetics, combined stresses, nitrous oxide, carbon tetrafluoride, argon, nitrogen, sulfur hexafluoride, helium, high pressure neurological syndrome, critical volume hypothesis anesthesia.</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0309
4. TITLE (and Subtitle)  Synergic Effects of Noise and Stress on General Behavior		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Busnel RG, Busnel MC, Lehmann AG		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  FRANCE: Lab Acoust Physiol, INRA, Jouy-en-Josas		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 7P 5R
14. PUBLICATION  Life Sci 1975 (1);16:111-137		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, mice (over 100 M swiss albino, age 2 mo) first kept in chamber at 33° C, were exposed to: SOUND, of 100, 105, 110 dbA at 50 Hz sine; also 60, 80, 100 dbA at 500, 2500, 10,000 Hz sine, all for 2 hrs, from loudspeaker; then EXERCISE, "swimming time" after drop into pool with 1.2-2.0 gm weight on tail, then "time to submersion". This time to submersion was reduced at sound of 80 or 100 dbA 500-10,000 Hz, also with sound over 100 dbA at 50 Hz. Seizures occurred within first 10 min of swimming; other signs of CNS excitation increased with both sound frequency and intensity. Muscular exhaustion was associated only with sound intensity, not frequency.		
19. KEY WORDS sound, exercise, combined stresses, neural disorders, survival, convulsions, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0213
4. TITLE (and Subtitle) Synergistic Effects of Acoustic Stimulation and of a Stressful Situation on Overall Demonstrable Behavior (Fr)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Busnel RG, Lehmann A		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS FRANCE: Lab Acoustic Physiol, INRA Jouy-en-Josas		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  Compt rend Acad Sci Paris Ser D 1974 (7);279:583-585		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 4P 4R
		15. SECURITY CLASS. (of this report)
16. EXTRACT In laboratory experiments, mice (200 M swiss albino), first kept in chamber at 33° C were exposed to: SOUND, at 60, 80, 100, 105, and 115 dbA at 50, 500, 2500, and 10,000 Hz for 60, 90, 120 min, from a loudspeaker; then EXERCISE, "swimming time" after drop into pool with weight on tail, to time of submersion. 17 Time to submersion is reduced at 80 and 100 dbA for frequencies of 500,2500,10,000 Hz; higher levels are needed at 50 Hz. Convulsive crises of 3-6 sec duration appear within first 10 min of swimming, eg with 100 dbA at 2500 and 10,000 Hz; from some increased excitation of the CNS.		15. DISTRIBUTION
18.		
19. KEY WORDS sound, exercise, combined stresses, neural disorders, survival, convulsions, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0220
4. TITLE (and Subtitle) Endocrine, Cardiovascular, Respiratory, and Body Temperature Changes in Man Exposed to Hypoxia Combined with Heat		5. TYPE OF REPORT & PERIOD COVERED Jnl abstract
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Hale HB, Sydnor KI, Sweat ML		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS AF Schl Av Med Randolph AFB TX; Western Resv Univ Schl Med Cleveland OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1954
		13. NUMBER OF PAGES AND REFS 2P no R
14. PUBLICATION Fed Proc 1954;13:65-66 (abstract)		16. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (M, young, 9 groups) were exposed to: HYPOXIA, pO <sub>2</sub> 12% in N <sub>2</sub> sea level pressure; and HEAT, 50°C. Treatments, after pre-exposure and room air and temperature controls, included: 12% O <sub>2</sub> for 2,15,45 min; heat at 50°C for 15,45 min; 12% O <sub>2</sub> + heat 50°C for 15,45 min. Measurements included: T <sub>skin</sub> , T <sub>rect</sub> , cardiovascular and respiratory indices, ACTH, adrenocorticosteroids. Cardiovascular responses to hypoxia were intensified by heat. There were no consistent changes in blood adrenocorticoids. No other data are available.		
18.		
19. KEY WORDS hypoxia, heat, combined stresses, physiological performance, endocrine, cardiovascular system, thermoregulation, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0259
4. TITLE (and Subtitle) Health Implications of Exposure to Radiofrequency Microwave Energies		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER UR-3490-2055
7. AUTHOR(s) Michaelson SM		8. CONTRACT OR GRANT NUMBER(s) G: DE-AC02-76EV03490
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Rochester Schl Med & Dent, Dept Rad Biol & Biophys, NY		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 15P 114R
14. PUBLICATION  Brit J Indust Med 1982;39:105-119		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT This review discusses a variety of factors involved in the action of microwaves and RF radiation. Frequency ranges considered are 300 KHz to 300 MHz RF and 300 MHz-300 GHz. Topics include: thermal vs non-thermal effects, experimental studies on cell, tissue, and organism chemistry, growth, endocrines, immune system, nervous system, behavioral effects; also extrapolation from animal experiments to man and utility of animal models. Surveys of human exposures, epidemiology of this radiation, critiques of Eastern European reports are discussed, and protection guides and standards, product emission and exposure standards are considered.		
19. KEY WORDS microwave radiation, radio radiation, multiple stresses, radiosensitivity, radiation pathology, non-thermal effects, non-ionizing radiation standards for protection		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0370
4. TITLE (and Subtitle) Tolerance of Rats to a Cold Environment During Multiple Exposures to a Low Dose of X-rays		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Newsom BD, Kimeldorf DJ		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Radiol Defense Lab, San Francisco CA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1961
		13. NUMBER OF PAGES AND REFS 4P 4R
14. PUBLICATION Am J Physiol 1961 (5);200:1039-1042		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (M,SD) were exposed to X-RADIATION (X) at 25 R/min, total 600 R, 250 kvp, whole body; and COLD, 6° C and 23° C. Using lethal doses made sublethal by fractionation, there was needed a greater interval between rad- iation exposures at 6° C than at 23° C to reduce lethal response. 17 Cold exposure also enhances the response to reduced food intake after daily 75 R doses of X. Irradiated rats are able to survive longer in the cold on reduced food intake than non-irradiated. 18.		
19. KEY WORDS x-radiation, cold, combined stresses, divided dosages, radiosensitivity, undernutrition, tolerance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0338
4. TITLE (and Subtitle) Species Difference in Altitude Tolerance Following X-Irradiation		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Newsom BD, Kimeldorf DJ		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Radiol Defense Lab San Francisco CA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1960
		13. NUMBER OF PAGES AND REFS 3P 14R
14. PUBLICATION Am J Physiol 1960 (4);198:762-764		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments with several animal species: rabbits (RB), rats (RT), hamsters (HM), guinea pigs (GP), and mice (MC); these were exposed to X-RADIATION at 25 R/min and 250 kvp whole body, to the total LD 50/30 for the given species, eg GP 200R, HM 500R, RT 600R, RD 800R, MC 675R. They were also exposed to HYPOBARIA (high altitude) and hypoxia, to 30,000-37,000 ft.; and DIET manipulation, including food deprivation. Treatments were: eg x-radiation, and ad lib food consumption with measurements of any anorexia for 3 days post irradiation, then 72 hrs later altitude exposure. Irradiated rabbits showed severe decrease in food consumption in the 3 day period, and increased hypoxia tolerance. GP and HM showed only slight decrease in hypoxic tolerance, with recovery in 24 hrs. MC, GP, HM showed no significant increase in hypoxic tolerance 3 days post radiation. Food lack increases altitude tolerance post rad all xc HM		
19. KEY WORDS x-radiation, hypobaria, hypoxia, undernutrition, combined stresses, mortality, anorexia, altitude tolerance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0291
4. TITLE (and Subtitle) Alterations in Physiological Accommodation to Stress Induced by Irradiation		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Newsom BD, Kimeldorf DJ		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Gen Dynamics Astronautics San Diego CA; USN Radiol Defense Lab San Francisco CA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1963
		13. NUMBER OF PAGES AND REFS 5P 8R
14. PUBLICATION Aerospace Med 1963 (Mar);34:226-230		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (young/adult/aged) were exposed to: NEUTRON RADIATION, to 220 Rad, fast neutrons from U Cal 60" cyclotron; and COLD, to -20° C. In one treatment, there was exposure to full dose of N, then C to -20° C during various times in a 30 day post radiation period. The neutrons impaired cold tolerance. At ½ dose neutrons caused loss of cold tolerance past 30 days, whereas x-radiation of similar dose caused tolerance loss with recovery of cold tolerance by day 22.		
17.		
18.		
19. KEY WORDS neutrons, cold, combined stresses, cyclotron, cold tolerance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0330
4. TITLE (and Subtitle) Biological Effect of Stress Following Ionizing Radiation		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Gambino JJ, Bennett LR, Billings MS Lamson BG		8. CONTRACT OR GRANT NUMBER(s) C:USAF-SAM-41(657)-275 C:AEC AT(04-1)Gen-12
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cal Schl Med Los Angeles CA Depts Radiol, Pathol, Biophys Nuclear Med		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1964
		13. NUMBER OF PAGES AND REFS 5P 41R
14. PUBLICATION Aerospace Med 1964 (3);35:220-224		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (195 F 6 wks old) were exposed to X-RADIATION (X) at 115 R/min, 500 R, 250 kvp, whole body; &/or BETA-RADIATION (B) from a <sup>90</sup> Sr applicator, 38 R/sec, 500 R, to exposed adrenals; and COLD, 0° C 3h/day (C). Treatments involved exposures at different ages to various combinations of these. 17 Life shortening occurred with 500R X whole body, but not with 500R B to adrenals. Cold exposure made no differences in these. But in total body irradiation, cold exposure can reduce slightly the acceleration of tumor onset associated with this radiation.		
18.		
19. KEY WORDS x-radiation, beta-radiation, cold, combined stresses, strontium 90, adrenals, thermal stress, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0337
4. TITLE (and Subtitle) Increased Tolerance to Hypoxia in Irradiated and in Food-Deprived Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Newsom BD, Kimeldorf DJ		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Radiol Defense Lab San Francisco CA		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Am J Physiol 1954 (6);177:390-394		12. REPORT DATE 1954
		13. NUMBER OF PAGES AND REFS 5P 17R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (30) were exposed to: X-RADIATION (X) 25-27 R/min to 500 & 600 R, 250kvp filtered, whole body; and HYPOXIA in ascent and descent in chamber at 500 ft/min to 28,900 ft for 4 hrs, on days 1, 3, 5, 9, 15 of study.. There was increased tolerance to lethal levels of hypoxia vs controls after X. This effect disappears 5 d after exposure to R both doses. If no food is taken for 72 hrs, the non-X animals increase tolerance to Hypoxia just like the X animals. At 72 hr this increased time to asphyxia is in part the consequence of post irradiation anorexia 18.		
19. KEY WORDS x-radiation, hypoxia, combined stress, anorexia, radiation tolerance, altitude, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0374
4. TITLE (and Subtitle) Thermoregulation in Irradiated Dogs Subjected to Heat Stress		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER UR-49-857
7. AUTHOR(s) Thomson RA, Michaelson SM, Quinlan WJ		8. CONTRACT OR GRANT NUMBER(s) C: AEC
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Rochester Sch Med & Dent, Dept Rad Biol Biophys NY		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1969
		13. NUMBER OF PAGES AND REFS 4p 9R
14. PUBLICATION Aerosp Med 1969 (3);4:283-286		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, dogs (28 Beagles, M, F, 4½-13 yr) were exposed to X-RADIATION (X) 60-65 R/min, 270-1800 R, 1000 kvp; and HEAT, 105° F, RH 25%, breezy, up to 6 hr. Treatments included: X whole body 270 R; 97 R to upper body to xiphoid process; 1800 R localized to thyroid. It was found that whole body X damages the thermoregulation apparatus, so that a progressive increase in rectal temperature may occur, under various X + heat conditions. This depends on part of the body exposed to X. Upper body X does not produce much change in rectal temperature. Localized thyroid X lowers heat production, then rectal temperature.		
19. KEY WORDS x-radiation, heat, combined stresses, thermoregulation, thyroid		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0102
4. TITLE (and Subtitle) Radiosensitivity of Animals Exposed to Ionizing Radiation in an Altered Gaseous Medium... **		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Vasin MV, Lvova TS, Antipov VV, Davidov BI, Koroleva LV, Petrukhin SV		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR (site not given)		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 6P 2R
14. PUBLICATION Radiobiol (USSR) 1980 (1);20:56-61		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT <p>Limited information provided on laboratory experiments with mice (CBAXC57BL and C57BL) exposed to GAMMA RADIATION, from <sup>60</sup>Co, 300-1000R, over 20 min; or HYPEROXIA, 100% Oxygen; and combinations of these. Inhalation of 100% Oxygen by intact animals elicits inhibition of mitotic activity in bone marrow, with no effects on cell fission in crypts of small intestine. But Oxygen enhances radiation injury of the small intestine, and protects bone marrow. This Oxygen effect is a function of radiation dose.</p>		
17.		
18.		
19. KEY WORDS gamma radiation, oxygen, combined stresses, radioactive cobalt, hyperoxia, radiosensitivity, hemopoietic tissue, interactive responses		
20. NOTES <p>** continuation of title: "...2.A Comparative Study of Effect of Breathing Pure Normobaric Oxygen during Irradiation on the Radiosensitivity of Hemopoietic Tissue and Small Intestine (Rus)"</p>		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0079
4. TITLE (and Subtitle) Effect of Sequential Exposure to Ionizing Radiation and to Heat on Antibody Production in Rats (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Gamzaeva IA, Gabai NS, Yagubov RF, Aivazova DK		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Microbiol & Hyg Instit Baku USSR		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Gig sanit (USSR) 1981 (1):35-36		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 2P 8R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (40 Wistar) were exposed to: GAMMA RADIATION, from <sup>60</sup> Co, total dose 0.11 Ci/kg, 7 hr/day; and HEAT, 40° C, 4 hr/day, for 7 mo. Treatments were: H, G, G then H. Long exposure to G reduced number of antibody-forming cells 18.3% in the spleen (after immunization with sheep RBC. 17 H + G further reduced the number of antibody-forming cells.		
18.		
19. KEY WORDS gamma radiation, heat, combined stresses, antibody production, radiosensitivity, spleen, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0098
4. TITLE (and Subtitle) Effect on the Body of Increased Ambient Temperature Combined with Radiation (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Tsapkov MM		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR (site not given)		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 3P 24R
14. PUBLICATION Gig sanit (USSR) 1981 (1);50-53		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
17. EXTRACT This brief paper compares experiments on mice, dogs, yeast cells, human lymphocytes, rats, humans, chinese hamster ovarian cells, in exposure to: HEAT (H) 43-45° C; X-RADIATION 180 R/min, 700-1500 Rad separately and consecutively or simultaneously. There are discussed LD50 radiation sickness, development of myelitis, altered osteogenesis, respiratory rate, cell survival, enzyme activities, chromosome aberrations, hemopoiesis, etc. Synergistic and potentiation effects are considered.		
18.		
19. KEY WORDS heat, x-radiation, combined stresses, animal models, radio-sensitivity, physiological responses, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0077
4. TITLE (and Subtitle) Structural Changes in the Thymus of Irradiated Animals Affected by Heat (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Budagov RS		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Sci Res Instit Med Radiol, Obninsk USSR		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 2P 5R
14. PUBLICATION Radiobiol (USSR) 1982 (2);22:278-279		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (180 M Wistar) were exposed to: GAMMA RADIATION, from <sup>60</sup> Co, 5.5 Gy, 0.005 Gy/sec; THERMAL BURN on 15% of body surface (source not discussed) applied within 10-20 min after G. G only and G + burn produce similar changes in histology of thymus, but the rate of recovery of cell count in thymus after combined exposure was lower than for G alone. Burn inhibits repair processes in thymus of irradiated animals.		
17.		
18.		
19. KEY WORDS gamma radiation, thermal burn, combined stresses, cobalt, thymus, thymocytes, infection, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0139
4. TITLE (and Subtitle) X-Radiation Effects on Vibration Tolerance of Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Short LL, Newsom BD, Brady JF		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Gen Dynamics Convair San Diego CA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1967
		13. NUMBER OF PAGES AND REFS 5P 45R
14. PUBLICATION Aerosp Med 1967 (2);38:140-144		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (147 F S-D) were exposed to: X-RADIATION, 7R/min 43 min exposures, total dose over 600 R; delivered in 8,7,7,7,7,7 min exposures with 7-8 min intervals between exposures, over period of 30 days; also VIBRATION (V), 0.5 in. dble amplit. (10 Gz peak), 20 Hz, 10 min exposure, given 17 on day 7, 14, or 21 after irradiation. Radiation mortality at 30 days was 5-10%, V alone mortality was 34%. No differences were seen in V alone or V + X. There is very little in common in the action mechanisms: radiation having biochemical effects, and V having mechanical actions, and effects on vestibule and Cv reflex- 18.es.		
19. KEY WORDS vibration, x-radiation, combined stresses, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0355
4. TITLE (and Subtitle) Influence of Chronic Acceleration on Effects of Whole Body Irradiation in Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Casey HW, Cordy DR, Goldman M, Smith AH		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS USAF Schl Aerosp Med, Brooks AFB, TX		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1967
		13. NUMBER OF PAGES AND REFS 7P 17R
14. PUBLICATION Aerosp Med 1967;38:451-457		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (170, in 7 groups). were exposed to: ACCELERATION, linear (G), 1.1-3.0 G, adjusted in 0.5Gz increments, continuously at constant level over 52 days (stopped a no. of times for feeding, observation), accompanied by rotation at 14 rpm; and GAMMA RADIATION (R) from <sup>60</sup> Co at 91-94 Rads/min with total to 700 Rads whole body. Treatment included: G (contin., selected level), then after "adaptation" to this, and 30-120 min after G off, 400 Rads, then return to 3 G or left at normal 1 G. Rats exposed to 2-3 G observed 4 mo showed no effects by day 7-14. and survive with suppressed body mass and reduced fat. X at 400 followed by 2 G showed increase in mortality, which was also higher at 3 G. Deceleration to normal G had then no influence on mortality. 3G + 700 Rads yielded 15/17 deaths. Thus continuous G after R increases radiation mortality.		
19. KEY WORDS gamma radiation, acceleration, combined responses, cobalt 60, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER
		A0233
4. TITLE (and Subtitle)		5. TYPE OF REPORT & PERIOD COVERED
Stress and Interstress Adaptation		Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
Leblanc J		G: Can MRC G; Can Def Res Bd
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
CANADA: Laval Univ Fac Med Dept Physiol Quebec.		
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE
		1969
		13. NUMBER OF PAGES AND REFS
		5P 10R
14. PUBLICATION		15. SECURITY CLASS. (of this report)
Fed Proc 1969 (3);28:996-1000		
		15a DISTRIBUTION
16. EXTRACT		
<p>This surveys experiments done with rats (M) exposed to: HYPOBARIA, HYPOXIA, taken to 30,000 ft 1/hr, held there 4 min, and returned to ground level (total time 8 min), repeated 18x over 2 days; and COLD, -20° C for 3 hr. With H alone, evidence of adaptation by day 3. Repeated short exposures to C alone im-</p> <p>17 prove survival in the cold, providing a non-specific adaptation, improving tolerance to H when H + C are applied. There are speculations about endocrine mediation, especially norepinephrine.</p> <p>18.</p>		
19. KEY WORDS		
hypobaria, hypoxia, cold, combined stresses, adaptations, endocrines, norepinephrine		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0317
4. TITLE (and Subtitle)  Microwave Radiation and its Effect on Response to X-Radiation		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Thomson RA, Michaelson SM, Howland JW		8. CONTRACT OR GRANT NUMBER(s) C:USAF-RADC AF30(602)-224 C:AEC W-7401-Eng-49
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Univ Rochester Schl Med & Dent Dept Rad Biol & Biophyics Rochester NY		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1967
		13. NUMBER OF PAGES AND REFS 4P 7R
14. PUBLICATION  Aerospace Med 1967 (3);38:252-255		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, dogs were exposed to MICROWAVE RADIATION, 100 mW/cm <sup>2</sup> , 2800 MHz, pulsed at 360 pps, with 2 usec pw whole body; and X-RADIATION, 4.6 R/min, 1656 R, 250 kvp. Treatment sequence was: x-rays; simultaneous microwaves and x-rays; 90 hr exposure to microwaves, then 9 mo later x-rays, whole body. 17 Mortality was higher with x-rays and microwaves than with x-rays alone (hemopoietic death). Microwave treatment can increase lethal effect of x-radiation, as a function of MW duration, total dose, rectal temperature attained, time before x-rays, and x-ray dose. 18.		
19. KEY WORDS microwave radiation, x-radiation, combined stresses, mortality, radiosensitivity, hemopoesis, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0225
4. TITLE (and Subtitle) Protection of the Microwave-Irradiated Brain with Body-Core Hypothermia		5. TYPE OF REPORT & PERIOD COVERED Abstract
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Sutton CH, Nunnally RL, Carroll FB		8. CONTRACT OR GRANT NUMBER(s) G: Vet Admin
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Miami Schl Med, Dept Neur Surg		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 1P no R
14. PUBLICATION Cryobiol 1973;10:513 (abstract)		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats were exposed to MICROWAVE RADIATION from 2450 Hz diathermy apparatus (no other data), and HEAT to head, at 40° C, 42° C, and 45° C., while in some experiments lowering core temperature to HYPOTHERMIA levels (values not given). In combined exposure to H and MR, survivals of 8-15 min seen with normothermic core temperature were increased up to 120 min in hypothermia. These prolongations existed even at brain temperatures to 45° C. It is believed that the integrity of the blood-brain barrier is violated when the brain is heated over 45 min at 40° C. Some testing of BBB integrity by detection of leakage at the cerebellum, was done with trace proteins, horseradish peroxidase.		
19. KEY WORDS microwave radiation, hyperthermia, hypothermia, combined stresses, blood brain barrier, radiation protection, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0322
4. TITLE (and Subtitle) Inhibition of Butylated Hydroxytoluene-Induced Mouse Lung Cell Division by Oxygen: Time-Effect and Dose-Effect Relationships		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Witschi H, Cote MG		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS CANADA: Univ Montreal Fac Med, Dept Pharmacol		8. CONTRACT OR GRANT NUMBER(s) GMRC MA-6151
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Chem Biol Interact 1977;19:279-289		12. REPORT DATE 1977
		13. NUMBER OF PAGES AND FIGS 13P 22R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, mice (20 M adult) were exposed to BUTYLATED HYDROXYTOLUENE (BHT), dose 250 or 400 mg/kg IP 1x; then after several days were exposed to OXYGEN, 100%, moist, for 24 hr. In measurement of incorporation of thymidine into pulmonary DNA: at 2, 3, 4 days after BHT, DNA synthesis was inhibited by 24 hr O <sub>2</sub> , 100%; at 5, 6, 7 days, there was no effect on synthesis. The same results were seen with incorporation of leucine into protein. The early proliferation of type I alveolar cells were more susceptible to cytotoxic effects of Oxygen than later interstitial and capillary endothelial cells.		
19. KEY WORDS butylated hydroxytoluene, oxygen, combined stresses, BHT, hyperoxia, thymidine incorporation, cell division, Type II alveolar cells, interstitial cells, capillary endothelium, pulmonary pathology		
20. NOTES HW 1977 to Oak Ridge Nat Lab Biol Div, TN		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0108
4. TITLE (and Subtitle) Synergism of Hyperoxia and High Helium Pressures in the Causation of Convulsions		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Brauer RW, Beaver RW		8. CONTRACT OR GRANT NUMBER(s) C:NM-ONR-N14-75-C-0468
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ NC (Wilmington), Instit Marine Biomed Res		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 11P 24R
14. PUBLICATION J Appl Physiol 1982 (1);53:192-202		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, mice (M adult CD) maintained at 33° C were exposed to HYPEROXIA (OHP) or high pO <sub>2</sub> , along with HIGH PRESSURE HELIUM (HP) in these treatments: compression in steps of 3 ATA at constant rate of 40, 100, 1000 atmo/hr; compression, but stops at a predetermined holding pressure; compression at 1000 atmo/hr but holding at one of several subconvulsive levels. The responses, high pressure neurological syndrome (HPNS) were Type I (involving hypothalamus, lateral thalamic nuclei, not cerebral cortex) and Type II (medial thalamus, cerebral cortex). HP + OHP beyond 1.8 ATA causes seizures at total HP lower than HP alone, for Type I but not Type II. This is not just an additive phenomena, but is CNS-selective. OHP exposure for 15 min is needed for OHP/HP lowering of I threshold. Type II may be influenced by indirect events, eg affecting cerebral blood flow		
19. KEY WORDS hyperoxia, high pressures, hyperbaria, combined stresses, helium, high pressure neurological syndrome, convulsions, interactive responses, hypothalamus, thalamus, cerebral cortex		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0031
4. TITLE (and Subtitle) Combined Effects of Broadband Noise and Complex Waveform Vibration on Cognitive Performance		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER AF-AMRL-TR-79-48
7. AUTHOR(s)  Harris CS, Shoenberger RW		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  USAF Aerosp Med Res Lab, WPAFB OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 6P 18R
14. PUBLICATION  Aviat Space Envir Med 1980 (Jan);51:1-5		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (12 M ages 23-40 yr, normal hearing) were exposed to SOUND (N) at 65 dbA or 100 dbA, 2.5-6.5 KHz flat, dropping at 5 db/octave below 2.5 KHz and 20 db/octave above 6.5 KHz, into headphones; VIBRATION (V) 0.36 Gz rms into hard seat, with spectrum a quasi-random sum of sines each at fatigue thresholds of 2.6, 4.1, 6.3, 10, 16 Hz. Treatments were: N(65); N(100); V + N(65); V + N(100); in random order in 4 sessions separated by 48 hr over 2 wk (after warmup, then 30 min exposure for a condition). Tasks were: complex counting (3 lights flash at 1 every 13 sec, 1/5 sec, 1/9 sec, all are counted with button for each light pressed every 6th flash). V + N100 causes less adverse effects than V + S65 (like earlier studies); V had a clear adverse effect on counting task; N100 also adverse effect on counting task.		
19. KEY WORDS  sound, vibration, combined stresses, psychomotor performance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0126
4. TITLE (and Subtitle) Effects of Combined Heat, Noise, and Vibration Stress on Human Performance and Physiological Functions		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER AF-AMRL-TR-71-19
7. AUTHOR(s) Grether WF, Harris CS, Mohr GC, Nixon CW, Ohlbaum M, Sommer HC, Thaler VH, Veghte JH		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USAF Aerosp Med Res Lab, WPAFB OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1971
		13. NUMBER OF PAGES AND REFS 6P 10R
14. PUBLICATION Aerosp Med 1971 (Oct);42:1092-1097		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (10 M fit, in flight clothing) were exposed to SOUND (N) at 80 and 105 db, white noise flat from 100 Hz-5 KHz into earphones; VIBRATION (V) at 0.3 Gz peak, 5 Hz sine, into hard seat for 35 min; HEAT (H) 120° F. Treatments, after 1 hr pre-exposure to H when used: 17. H; V; N; V + N + H; after 30 min baseline data, 30-60 min: pre-exposure testing, at 60-65 min N and/or V; 65-95 min, exposures with performance testing, at 95-100 min, back to ambient; at 100-130 min post-exposure performance. Tasks: tracking (2-D compensatory), mental arithmetic, reaction time, visual acuity, voice 18. communication. H alone affected heart rate, skin temperature, weight loss; H or V or N increased reaction time, decreased vigilance, impaired tracking, and visual acuity with V; combined stresses did no more than the single greatest stressor. No evidence of synergy.		
19. KEY WORDS sound, vibration, heat, combined stresses, psychomotor performance, physiological responses, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0315
4. TITLE (and Subtitle) Separation of the Effects of Raised Skin and Core Temperature on Performance of a Pursuit Rotor Task		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Allan JR, Gibson TM		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS ENGLAND: RAF Instit Aviat Med Farnborough		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 5P 8R
14. PUBLICATION  Aviat Space Environ Med 1979 (7); 50:678-682		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (6 M, 21-27 yr, un-acclimatized) were exposed to HEAT (H), core temperature increases to 37.9° C, 38.2° C, 38.5° C were induced using a water suit, with core temperature raised and lowered in 2 consecutive events. Tasks included pursuit rotor test (pointer must be matched to position of lights on revolving arm) done for 60 sec at 3 points in each heating and cooling cycle; and work output on a bicycle ergometer. Performance was worse when core temperature was raised; decrements were 13.6% at 37.9° C, 16% at 38.2° C, and 18.1% at 38.5° C. There were differences in performance drops between heating and cooling phases, perhaps due to substantial differences in skin temperature.		
19. KEY WORDS heat, skin temperature, core temperature, thermal stresses, psychomotor performance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0028
4. TITLE (and Subtitle) Further Study of Combined Heat, Noise, and Vibration Stress		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER AF-AMRL-TR-71-131
7. AUTHOR(s) Grether WF, Harris CS, Ohlbaum M, Sampson PA, Guignard JC		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USAF Aerosp Med Res Lab, WPAFB OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 5P 4R
14. PUBLICATION  Aerosp Med 1972 (June);43:641-645		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (12 M, fit) were exposed to SOUND (N) at 80 db and 105 db, broadband noise, into earphones for 35 min; VIBRATION (V) at 0.3Gz peak, 5 Hz sine, into hard seat, for 35 min; and HEAT (V) 120° F for 95 min. Treatments were: V; V + H; V + H + N; each session 95 min, with N or V applied 60 min after start; H applied at 0 time for 1 hour soak. Tasks were: 2-D compensatory tracking of dot in scope with RH controller; choice reaction time with lights to put on and off; telephone test with 24 voice messages and yes-no answers; mental arithmetic problems, visual acuity, and subjective rating of severity of stress. V alone induced the greatest errors in reaction time and tracking; errors were lower for V + H (marginally); and errors were lowest for V + H + N, an apparent antagonistic response		
19. KEY WORDS sound, vibration, combined stresses, psychomotor performance, interactive responses, heat		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD759329	3. CATALOG NUMBER A0055
4. TITLE (and Subtitle) Combined Effects of Noise and Vibration on Human Tracking Performance and Response Time		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Sommer HC, Harris CS		6. PERFORMING ORG. REPORT NUMBER AF-AMRL-72-83
		8. CONTRACT OR GRANT NUMBER(s) EPA: IAG-0181 (D)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USAF Aerosp Med Res Lab, WPAFB OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 5P 5R
14. PUBLICATION Aerosp Med 1973 (Mar);44:276-280		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (12 M ages 19-23 yr, normal hearing) were exposed to SOUND (N) at 60 db or 100 db, 31.5 Hz-10 KHz (white noise) into earphones; VIBRATION (V) 0.10 Gz peak at 6.0 Hz into hard seat from shaker. Treatments were: N(60); N(100); V + N(60); V + N(100); randomized in 5 19-min trials, with 10 min rest, for total of 2.5 hr. Tasks: Tracking (centering of moving dot in circle in scope, with 2-axis RH control; and reaction time with lights on/off panel and LH switch. N alone had little consistent effect. V alone impaired 2 axis tracking. With V + N60 the effect was greater than V alone; V + N100 showed a smaller effect, thus a combined subtractive interaction. Speculations include arousal, inhibition of one sense by another.		
17. KEY WORDS sound, vibration, combined stresses, psychomotor performance, interactive responses, arousal		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0030
4. TITLE (and Subtitle) Interactive Effects of Intense Noise and Low Level Vibration on Tracking Performance and Response Time		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER AF-AMRL-TR-73-14
7. AUTHOR(s) Harris CS, Sommer HC		8. CONTRACT OR GRANT NUMBER(s) EPA: IAG-0181 (D)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USAF Aerosp Med Res Lab, WPAFB OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 4P 7R
14. PUBLICATION Aerosp Med 1973 (Sep);44:1013-1016		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (12 M ages 19-24 yr, normal hearing) were exposed to SOUND (N) at 60 db or 110 db 31.5 Hz-16 KHz white noise into military earphones; VIBRATION (V) 0.10 Gz peak into hard seat from shaker. Treatments were: N(60); N(110); V + N(60); V + N (110), given in random 4 min exposure periods and 1 min rest totalling 79 min in a trial, with 11 min rest between trials and 3 trials/session in 4 sessions. Tasks: two axis tracking, centering moving dot into scope circle using 2-axis RH controller; and response time in switching pattern of lights (red lights off, green lights on with LH switch. N impaired tracking performance, V impaired tracking performance; N + V had an additive adverse effect. At this higher sound level N110 + V are additive, a switch from subtractive effect found in earlier study at N100 + V		
19. KEY WORDS sound, vibration, combined stresses, psychomotor performance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0321
4. TITLE (and Subtitle) Combined Effects of Noise and Vibration on Mental Performance as a Function of Time of Day		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER AF-AMRL-TR-70-36
7. AUTHOR(s) Sommer HC, Harris CS		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USAF Aerosp Med Res Lab, WPAFB OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 8P 3R
14. PUBLICATION Aerosp Med 1972 (5);43:479-482		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (10 M ages 23-30 yr, normal hearing) were exposed to SOUND (N) 85 db or 110 db, 31.5 Hz-16 KHz (white noise) into earphones; VIBRATION (V) 0.25 G <sub>z</sub> peak at 5 Hz to hard seat from shaker. Treatments were: V+N(110) at 0600; N(85) at 0600; V+N(110) at 1500; N(85) at 1500. After 1 day practice, random exposures of 20 min 1/day for 4 days at 0600 or 1500. Tasks included arithmetic problems with displays presented and answers announced 18 x/session, scored for times to memorize and to calculate, and correct answers, for 6 problems. Performance was marginally deficient at 1500, compared with 0600 with N+V; without stresses, there was slight improvement at 1500 over 0600. Circadian cycle may intervene.		
19. KEY WORDS sound, vibration, combined stresses, psychomotor performance, time of day, circadian rhythms, arousal theory		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO. ADA019315	3. CATALOG NUMBER A0051
4. TITLE (and Subtitle) Interactions and Range Effects in Experiments on Pairs of Stresses: Mild Heat and Low Frequency Noise		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER OES-8174 1/74
7. AUTHOR(s)  Poulton EC, Edwards RS		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS ENGLAND: MRC Appl Psych Unit Cambridge		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 8P 26R
14. PUBLICATION  J Exp Psychol 1974;102:621-628		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (12 fit M ages 18-28 yr) were exposed to HEAT (H) 38°C, COLD (C) 20°C, and SOUND (N) 102 db (low-frequency passed "green noise" with rumble-like quality, used to avoid hearing loss of higher frequencies) from loudspeaker. Treatments were: N,H,N+H,O; O,N+H,H,N; H,N,C,N; N+H,C,N,H. Tasks done for 30 min were: reaction time (lights at 0°, 20°, 250°, 280°, when light flashed, switched off by subject); choice reactions (for each of several lamps randomly on, that lamp must be touched); vigilance (with background lights flashed at 0.4 sec in pattern, one sometimes flashed for 0.3 sec, 5x in each 7.5 min, to be turned off). N alone improved tracking and lowered fatigue (possibly arousal); H + N reliably interact, cause decrement in tracking. This event was antagonistic, with combined effect less than the sum of the two stresses.		
17. KEY WORDS heat, cold, sound, combined stress, psychomotor performance, interactive responses, human subjects		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0217
4. TITLE (and Subtitle) Combination Effect of Ozone and Sulfur Dioxide on Pulmonary Function in Man		5. TYPE OF REPORT & PERIOD COVERED Abstract
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Hazucha M, Parent C, Bates DV		8. CONTRACT OR GRANT NUMBER(s) G: MRC
9. PERFORMING ORGANIZATION NAME AND ADDRESS CANADA: McGill Univ. Fac Med, Dpt Physiol		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 1P No R
14. PUBLICATION  Fed Proc 1974; 33:350 (Abstr)		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (young, fit, non-smokers) were exposed to OZONE, 0.37 ppm or SULFUR DIOXIDE, 0.37 ppm or both simultaneously, for 2 hrs. Pulmonary function measurements were made every 30 min during and after exposure until all values had returned to pre-exposure levels. The combined stresses had much greater effects than each stressor alone. The most sensitive index was max expiratory flow rate (at 50% VC), which fell to 75% in 1 hr, then to 55% in 2 hr. Also dropping were lung capacity, closing and residual volumes. The same potentiating effects were seen with intermittent exercise. There was no discussion of mechanism of interaction.		
17. KEY WORDS Ozone, sulfur dioxide, combined stresses, toxicity, pulmonary function, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0148
4. TITLE (and Subtitle) Use of a Constant Magnetic Field for Treatment of Vibration Disease (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Naumenko BS, Pidpaly GP, Stardubtsev IS		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Sci Instit Hyg, Krivoi Rog, Ukraine, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 3P 7R
14. PUBLICATION Vrach delo (USSR) 1981 (12);106-108		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT Clinical observations of a limited descriptive nature are provided concerning miners (50, ages 35-45 yr) in Stage 1 (USSR) of vibration disease; VIBRATION exposure derived from mining tools, over 15 yr period. This group was treated in two ways: with CONSTANT MAGNETIC FIELD (CMF) of 150-200 oersted, in 20 exposures, each of 15-20 min; and with THERAPEUTIC DRUGS, such as sympatholytics, spasmolytics, ganglionic blockade agents. The CMF responses were stated as analgesic, "normalizing" blood pressure and vascular tonus, and effective in inhibition of catecholamine in excretions.		
17. 18.		
19. KEY WORDS vibration, magnetic fields, combined stresses, mining, vibration syndrome, biomagnetism		
20. NOTES		

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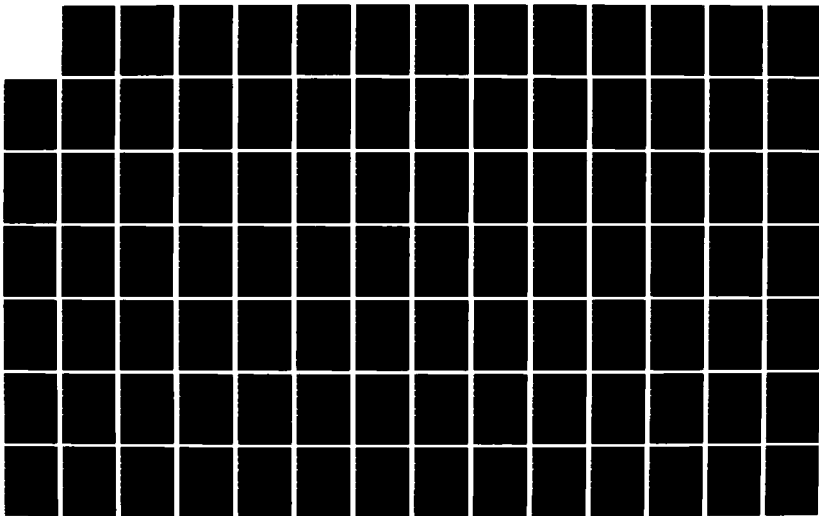
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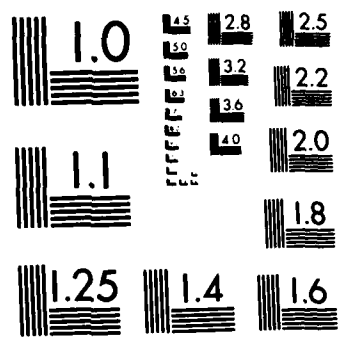
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CHEMICAL/PHYSICAL  
COMBINED STRESS EXTRACTS

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0260
4. TITLE (and Subtitle)  Review of Environmental Factors Affecting Hearing		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Mills JH, Goings JA		8. CONTRACT OR GRANT NUMBER(s)  G: NIH-NIEHS
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Med Univ SC Dept Otolar Charleston		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 9P 58R
14. PUBLICATION  Environ Hlth Perspect 1982 (4);44:119-127		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT Topics include: impulse noise (impact, intermittent) and steady noises, differences and synergies in effects on cochlea, the role of reflex response; noise and aminoglycoside antibiotics, as examples of synergistic actions on cochlea; industrial study problems, noise measurement, contamination by other environmental factors, standards, disability, work performance; aging and presbycusis, sites of pathology; viral damage to hearing, cyto-megaloviruses, rubella, etc.; and a long array of toxic chemical factors  18.		
19. KEY WORDS sound, noise, hearing, combined stresses, antibiotics, toxic chemicals impulse noise, cochlear damage, presbycusis, other interactive responses, hearing disability		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER AC132
4. TITLE (and Subtitle) Hypothermia Induced by Chlorpromazine or L-Tryptophan: Effects on Treadmill Performance in the Heat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Francesconi R, Mager M		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Res Instit Envir Med Natick MA		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 5P 20R
14. PUBLICATION J Appl Physiol 1979 (4);47:813-817		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
17. EXTRACT In laboratory experiments, rats (M adult SD) were exposed to: CHLORPROMAZINE (CPZ) IV 100 ug or L-TRYPTOPHAN IV 200 mg/Kg under restraint; to induce hypothermia they were housed in COLD at 4° C. When appropriate Tcore of 32-33° C was reached (in 40-60 min), rats were exposed to HEAT, at 35° C, and EXERCISE on treadmill until hyperthermic exhaustion. Initial temperature has a major effect of endurance capacity; initial hypothermia prolongs time to hyperthermic exhaustion. These CPZ or TRY improved running times had no extra beneficial effect on thermoregulatory cooling rates after exhaustion.		
18.		
19. KEY WORDS chlorpromazine, l-tryptophan, combined stress, exercise, hyperthermia, exhaustion, hypothermia, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0367
4. TITLE (and Subtitle) Chronic Chlorpromazine Administration in Rats: Effects on the Ability to Work in the Heat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Francesconi R, Mager M		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Instit Envir Med Natick MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 8P 20R
14. PUBLICATION  J Appl Physiol 1981 (3);50:509-512		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (M CD) were exposed to: CHLORPROMAZINE at 2 mg IP for 250-350 g rats for 14 consec days; then were exposed to HEAT at 35° C and EXERCISE on treadmill to hyperthermic exhaustion (T <sub>core</sub> to 42.5-43° C). Chlorpromazine increased plasma lactate, reduced endurance, increased body 17 heating and raised T <sub>core</sub> on treadmill, all toward injury end- points. Thus CPZ reduces ability to work in the heat.  18.		
19. KEY WORDS chlorpromazine, heat, combined stresses, exercise, work, heat exhaustion, thermoregulation, hyperthermia, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0052
4. TITLE (and Subtitle) Interactions, Range Effects, and Comparisons Between Tasks in Experiments Measuring Performance with Pairs of Stresses: Mild Heat and 1 Mg of L-Hyoscine Hydrobromide		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Poulton EC, Edwards RS		6. PERFORMING ORG. REPORT NUMBER RNPRC-BR35-739
9. PERFORMING ORGANIZATION NAME AND ADDRESS ENGLAND: MRC Appl Psych Unit Cambridge		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  Aerosp Med 1974 (July);45:735-741		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 7P 19R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
18. EXTRACT In laboratory experiments, human subjects (12 M 18-27 yr) were exposed to HEAT, 38° C; also L-HYOSCINE hydrobromide at 1 mg, given 1.5 hr earlier. Performance measurements included: tracking (compensatory) with system of lights, multichoice light and stylus-touch system, Wilkinson auditory vigilance task (with irregular auditory cues). The order of testing was important in determining combined stress-response interactions. L-hyoscine alone or heat alone increased response time. L-H + heat were synergistic, with greater reduction in response times than the separate stressors produced. Vigilance response was most affected.		
19. KEY WORDS hyoscine, heat, combined response, psychomotor performance, vigilance, tracking, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0349
4. TITLE (and Subtitle) Glucose Tolerance in Dogs Exposed to Altitude and Drug Administration. 1. Chlorpromazine		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Bernardini AT, Taub M		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS AF Schl Aerosp Med Brooks AFB TX		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Aerosp Med 1969 (5);40:536-538		12. REPORT DATE 1969
		13. NUMBER OF PAGES AND REFS 3P 13R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, dogs (M) were exposed to: HYPOBARIA with normoxia, to simulated 27,000 ft but with 100% oxygen supply at gnd level by mask; also CHLORPROMAZINE at 2.5 mg/Kg IV. Altitude exposure was for 30 min. Glucose tolerance after 20% glucose IV was measured. The most rapid rate of glucose elimination occurred at ground level with chlorpromazine. This rate is cut by 50% with chlorpromazine is given with altitude exposure. The CPZ also exerts its basic effects in lowering systemic blood pressure and core temperature.		
17. 18.		
19. KEY WORDS chlorpromazine, hypobaria, normoxia, combined stresses, altitude, glucose tolerance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER AC348
4. TITLE (and Subtitle) Effects of Reduced Pressure and Drug Administration on Glucose Tolerance Test in the Dog		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Bernardini AT, Taub M		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USAF Schl Aerospace Med Brooks AFB TX		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1969
		13. NUMBER OF PAGES AND REFS 4P 18R
14. PUBLICATION Aerospace Med 1969;40:409-412		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, dogs (M) were exposed to: HYPOBARIA without hypoxia, to 27,000 ft but given 100% sea level Oxygen by mask; and given AMPHETAMINE at 1 mg/Kg IV, or BENADRYL 2 mg/Kg IV, or DEMEROL at 1.8 mg/Kg IV. Glucose tolerance was measured. There was increased glucose elimination with hypobaria. Each drug alone also enhanced glucose elimination. Except for Demerol, benadryl or amphetamine + altitude increased glucose decay. Also the basic effects of amphetamine as analeptic, increasing blood pressure and respiration; and of Benadryl as antihistaminic and vasodilator; and of demerol as hypotensive agent were seen.		
19. KEY WORDS hypobaria, therapeutic drugs, combined responses, amphetamine, benadryl, demerol, glucose tolerance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER
	ADA055089	A0041
4. TITLE (and Subtitle) Cardiorespiratory Assessment of Decon- gestant-Antihistamine Effects on Altitude, +Gz, and Fatigue Tolerances		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER FAA-OAM-78-20
7. AUTHOR(s) Lategola MT, Davis AW Jr, Lyne PJ, Burr MJ		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FAA Civil Aeromed Instit Okla City		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 9P 16R
14. PUBLICATION Aviat Space Environ Med 1979 (Feb);50:101-109		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (M adult) were exposed to: HYPOBARIA, HYPOXIA at 12,500 ft simulated altitude, for 2 hr; DRISTAN (phenylephrine + phenindamine + aspirin + cafein etc); or ACTIFED (pseudoephedrine + triprolidine); and ACCELERATION SIMULATION (Gz) using lower body clothing which 17 applied a -40 mm Hg pressure to extremities, for 2 hrs. These stresses were applied in various combined treatments. All combin- ations of one of the two drugs, altitude, Gz were tolerated well (except for an actifed-altitude interaction on heart rate, en- hanced when the simulated Gz is applied).Also, neither drug has 18 effect on short duration post altitude ergometer fatigue.		
19. KEY WORDS antihistaminics, decongestants, hypobarica, combined stresses, altitude, fatigue, exercise, dristan, actifed, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO. ADA054793	3. CATALOG NUMBER A0033
4. TITLE (and Subtitle) Effects of Altitude and Two Decongestant-Antihistamine Preparations on Physiological Functions and Performance		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER FAA-OAM-78-19
7. AUTHOR(s) Higgins EA, Chiles WD, McKenzie JM, Jennings AE, Funkhouser, GE, Mullen SR		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FAA Civil Aeromed Instit Okla City		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 5P 9R
14. PUBLICATION Aviat Space Envir Med 1979 (Feb);50:154-158		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (14 M 18-33 yr) were exposed to: HYPOBARIA, HYPOXIA at 12,500 ft simulated for 2 hr, after prior dose of: DRISTAN (phenylephrine + phenindamine + aspirin + caffeine + etc) or ACTIFED (pseudoephedrine + triprolidine). Observations were made of fatigue, performance on multiple task batteries, heart rate, blood pressure, temp etc. While fatigue went up with time, task performance showed no effects of altitude, drugs, or time. One response, heart rate showed increases significantly higher at altitude with the Actifed (which acted as a stimulant) in magnitude more than the sum of effects of Actifed or altitude.		
19. KEY WORDS antihistaminics, decongestants, hypobaria, combined stresses, task performance, heart rate, dristan, actifed, fatigue, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0147
4. TITLE (and Subtitle)  The Effect of Hyperbaric Helium-Oxygen on the Acute Toxicity of Several Drugs		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Small A		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  USN Med Res Instit Bethesda MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NM RT MRO05.01-0093
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1970
		13. NUMBER OF PAGES AND REFS 12P 26R
14. PUBLICATION  Toxicol Appl Pharmacol 1970;17:250-261		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (M, SD) and mice were exposed to: HYPERBARIA, with Helium 19.2 atmo--Oxygen 0.2 atmo mix for 45 min then were given these drugs: PENTOBARBITAL 40 mg/kg iv (lethal dose), to rats; LIDOCAINE to rats 9.75 mg/ml given iv at 0.2 ml/min (lethal dose); ETHANOL to rats 0.104 ml/min iv (lethal dose); MORPHINE to rats IV at LD <sub>50</sub> level; and ASPIRIN to mice po at LD <sub>50</sub> level. Drugs were given separately. The 2-hr LD was determined by slow infusion to point of cardiac arrest (xc aspirin oral 3 hr mortality). The acute toxicity of all drugs used was not altered by exposure to the hyperbaric environment. 17. This does not speak for any altered therapeutic effectiveness in these same environments.		
18. KEY WORDS hyperbaria, therapeutic drugs, combined stresses, heliox mix- tures, cardiac arrest, acute toxicity, lidocaine, pentobarbital, ethanol, morphine, aspirin, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0046
4. TITLE (and Subtitle) The Pressure Reversal of a Variety of Anesthetic Agents in Mice		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Miller KW, Wilson MW		8. CONTRACT OR GRANT NUMBER(s) C: ONR-N14-75-C-0727 G: NIH GM RCDA199 to KM
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harvard Med Schl Dept Anesth at Mass Gen Hosp Boston		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 7P 27R
14. PUBLICATION  Anesthesiol 1978 (Feb);48:104-110		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, mice (CD) were exposed to HYPERBARIA with Helium at 2 atm/min to 125 ATA, 30 min after administration of these anesthetics to different groups: PHENOBARBITAL .17 g/Kg IP, alpha-chloralose to 0.04 g/Kg IP, ethyl carbamate to 1.45 g/Kg IP, Argon to 24.2 atmo, and Nitrogen to 48.8 atmo. Righting reflexes and sleep duration were observed. The potencies of anesthetics can be reversed in hyperbaria, eg ED <sub>50</sub> 100 atmo:1 atmo for a-chloralose is 1.74, for ethyl carbamate 1.64, for phenobarbital 1.54, for Argon 1.36, and for Nitrogen 1.34. These increased ED <sub>50</sub> were linear functions of pressure. The author discusses in this context alternate fluidized membrane or critical volume hypotheses of anesthesia.		
19. KEY WORDS anesthesia, hyperbaria, combined stresses, phenobarbital, alpha-chloralose, ethyl carbamate, argon, nitrogen, helium, sleep, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0054
4. TITLE (and Subtitle) Nonlinear Antagonism of Anesthesia in Mice by Pressure		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Smith RA, Smith M, Eger EI, Halsey MJ, Winter PM		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cal San Franc Schl Med Dept Anesth;		8. CONTRACT OR GRANT NUMBER(s) G: NIH GM-15571
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Anesth Analg (Clevel) 1979;58:19-22		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 4P 21R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, mice were exposed to: HYPERBARIA, with Helium to 100 ATA; and ANESTHESIA induced by Nitrogen or Argon. Ar or N <sub>2</sub> abolished righting reflexes in 50% at Helium high pressure. At 100 ATA to attain anesthesia requires 55% more Argon or 27% more Nitrogen. This antagonism by Helium is not a simple reciprocal relation.		
18.		
19. KEY WORDS hyperbaria, anesthesia, combined stresses, nitrogen anesthesia, argon anesthesia, righting reflexes, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0092
4. TITLE (and Subtitle) Clinical and Experimental Studies of Aural Lesions Following Exposure to Metallic Mercury Fumes and Noise (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Palgov VJ, Pokotilenko AK, Novikova VA, Dmitrenko VV, Bakay EA		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Instit Otolar, Kiev, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 6P 12R
14. PUBLICATION Gig trud (USSR) 1972 (11);16-21		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT Workplace observations and clinical studies were made on workers exposed to SOUND and to MERCURY VAPORS (at approximate levels used in experiments below); 190 men were observed at some times over a 5-10 yr work exposure period. Sound alone produced signs of cochlear neuritis (from cochlear potential changes) and hearing disorders. Sound enhanced mercury induced hearing loss (measured audiometrically). In lab experiments, guinea pigs (18) were exposed to SOUND (S) at 94-105 dbA (no other data) and MERCURY VAPOR (M) 0.023-0.037 mg/m <sup>3</sup> . S + M produced 2-3 X the biopotential change of M alone, showing also cochlear and auditory nerve mixed types of damage, toxic labyrinthitis and neuritis. There is limited discussion of the different dystrophic mechanisms and interactions on these sensory targets.		
17. KEY WORDS sound, mercury vapor, combined stresses, toxicity, workplace hazards, neuritis, hearing loss, cochlear damage, biopotentials, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0022
4. TITLE (and Subtitle) The Effect of Vibration on Mercury Metabolism in the Organism (Rus)		5. TYPE OF REPORT & PERIOD COVERED
7. AUTHOR(s) Tartakovskaya LY, Rozenberg EE		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Instit Hyg, Sverdlovsk, USSR		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 5p 9R
14. PUBLICATION Gig trud (USSR) 1976 (4);32-36		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (F, random bred) were exposed to: VIBRATION (V), 0.44 mm displacement, 48-52 Hz sine, whole body, direction not given, 3 hr/day for 12 wk; and ETHYLMERCURYCHLORIDE (EMC) (tagged with $^{203}\text{Hg}$ , 0.58 uCi) once every 2 days, for 3, 7, or 12 wk, with total dose of 4, 9, or 12 mg. Treatments were: V + EMC, V+EMC then V alone for 4 wks, or V for 3, 12 wk then EMC 1 time at 1 mg. EMC + V for 3 and 12 wk resulted in changes in Hg metabolism, even after stopping the EMC; there was delayed excretion, increased accumulation, which cleared up in part in 12 wks, even during concurrent administration. V + EMC (1 time, 1 mg) had same effect. The combination somehow causes changes in Hg distribution, and may alter vascular permeability of blood brain barrier.		
19. KEY WORDS vibration, ethylmercurychloride, combined stresses, organomercury, chemical toxics, metabolism, vascular permeability, toxics clearance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0081
4. TITLE (and Subtitle) Combined Effects of Physical and Chemical Factors during Industrial Applications of Plasma Processes (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Ilnitskaya AV, Koroleva VA, Levin AI		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Instit Hyg, Moscow, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 3P 7R
14. PUBLICATION  Gig san (USSR) 1981 (1);30-32		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT Workplace observations in welding and cutting activities, on 97 employees (ages 24-43 yr, exposed for 3-12 yr) concerned exposures to SOUND (S) 120-130dbA at 4, 6, 8 KHz; or ULTRAVIOLET RADIATION, 7.4 W/m <sup>2</sup> 26-340 nm; of mixes of OZONE and NITROGEN OXIDES in aerosols (values not avail). Changes were reported 17 in this combined stressor exposure, chiefly autonomic and neurasthenic syndromes, also progressive hearing losses, altered EEG alpha, and certain responses to photic stimulation, vascular disturbances including cerebral blood flow, and EKG changes. No other data are available. 18.		
19. KEY WORDS sound, ultraviolet radiation, ozone, nitrogen oxides, combined stresses, welding industry, autonomic disturbances, EEG, EKG, cerebral blood flow, neurasthenia, neuropathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0103
4. TITLE (and Subtitle) The Joint Action of Benzene, Vibration, and Noise on the Body (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Verzilova OV, Rodnikov AV, Nikitina LA, Room EV, Komarova VV, Razbash FL, Zimina LN		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Industr Hyg Instit, Moscow, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 4P 5R
14. PUBLICATION  Gig san (USSR) 1978 (8);20-23		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (albino) were exposed to: BENZENE 5, 15 mg/m <sup>3</sup> by inhalation for 5 mo, or 0.5 g/kg sc 2x/wk for 3 wk (B); also VIBRATION, 80 db at 16 Hz (no other data) (V); or SOUND from 66 db to MPL (no other data) (S). Treatments were: Binhal + V + S, Binhal + V; or Bsc + V, Bsc + S. 17 Observations were made of body wt, respiratory rate, heart rate, rbc count, hemoglobin level, blood chemistry, and various reflexes V and S potentiated the effects of Binhal or Bsc. V + B + S yielded enhances effects, threshold shifts, and morphological changes even when B was kept at MPC threshold. It is recommended 18. in combined exposures, the MPC be decreased from single exposure levels for each stressor here.		
19. KEY WORDS benzene, vibration, sound, combined stresses, toxicity, chronic exposures, MPC and MPL modifications, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0072
4. TITLE (and Subtitle) Investigation of Combined Action of Vibration and Lead on Metabolism of the Liver and Kidneys in Albino Rats (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Antov GP, Ivanovich E, Zapryanov Z		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS BULGARIA: Sofia (site not stated)		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Gig trud (USSR) 1978 (5);54-56		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 3P 10R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (M Wistar age 3 mo) were exposed to: VIBRATION (V) 0. mm amplitude at 100 Hz 2 hr/day for 10 days (no other data avail): and/or LEAD ACETATE, 20 mg/Kg po 1/day for 10 days. Extensive measurements of liver and kidney metabolism included succinate dehydrogenase, malate dehydrogenase, LDH, G-6-PDH, cytochrome oxidase, alkaline phosphatase, acid phosphatase, isocitrate dehydrogenase, ATPase, glucose-6-phosphatase, etc. V and Pb have an additive effect on most of these; V affects distribution and accumulation of Pb and enhances its toxicity.		
18. KEY WORDS vibration, lead acetate, combined stresses, liver enzymes, kidney enzymes, metabolism, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0094
4. TITLE (and Subtitle) An Analysis of the Degree of Influence of Environmental Factors with Multiple Combined Effects (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Sova RE, Tsapko VG, Gokhman VL		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Instit Hyg, Kiev, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 3P no R
14. PUBLICATION  Gig trud (USSR) 1974 (2);46-48		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, lab animals (no other data) were exposed to: SOUND (no other data); CHLOROPHOSPHATE INSECTICIDES at 1/20 LD <sub>50</sub> (no other data), in various combinations, and measurements such as cholinesterase activity were made. The report provides analytical statistical model for multiple combined effects, with limited information.		
18.		
19. KEY WORDS sound, chlorophosphate insecticides, combined stresses, cholinesterase, toxicity, combined effects models		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0096
4. TITLE (and Subtitle) The Problem of Combined Action of Phosphorus Organic Pesticides and Noise on the Body of Warm Blooded Organisms (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Tsapko VG		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Sci Res Instit Hyg, Kiev, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 4P 6R
14. PUBLICATION  Gig sanit (USSR) 1976 (5);32-35		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, lab animals (not specified) were exposed to: DIPTEREX (chlorophose) at 0.5 mg/m <sup>3</sup> (MPL) or 2 mg/m <sup>3</sup> ; and SOUND at 85 or 105 dbA (no other data) in exposures to both at 2 hr/day for 4 mo. Measurements included: cholinesterase activity, indices of natural immunity (complement, lysozyme, B-lysine, blood bacticidal activity, phagocytic activity of neutrophils). D (0.5) + S (85) caused inhibition of cholinesterase activity. D (0.5) + S (105) caused further reduction. D (2.0) + S (85 or 105) further inhibited cholinesterase, in combined potentiating effects, including changes in immunologic factors. It is recommended that permissible levels for single stressors be reduced when they comprise combined exposures.		
17. KEY WORDS sound, dipterex insecticide, combined stresses, cholinesterase, natural immunity, immunopathology, organophosphates, toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0091
4. TITLE (and Subtitle) Effect of Motor Transport Noise and Atmospheric Air Gases on the Organism (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Nikitina NG		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Industr Hyg Instit, Kiev, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 4P 6R
14. PUBLICATION Vrach delo (USSR) 1974 (10);123-126		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In experiments simulating urban exposures to traffic conditions, laboratory animals (unspecified) were exposed to SOUND in range of traffic noise to 80 dbA (no other data), and CARBON MONOXIDE at 0.66-20.0 mg/m <sup>3</sup> . Measurements were made during combined exposures for 3 mo, of body wt, bioelectric activity of cerebral cortex, cholinesterase activity, etc. The combined exposures produced certain inhibitions of CNS activity. Each factor alone caused no action at the doses stated. No other data are provided.		
18.		
19. KEY WORDS sound, carbon monoxide, combined stresses, urban traffic, cholinesterase, air pollution, toxicity, neuropathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0095
4. TITLE (and Subtitle) The Joint Action of Environmental Factors in Industry and Their Standardization (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Tarasenko NY, Kasparov AA, Smirnova EM, Ananiev BV		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS First Moscow Med Instit, USSR		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Gig san (USSR) 1971 (7);27-32		12. REPORT DATE 1971
		13. NUMBER OF PAGES AND REFS 6P 18R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT Occupational observations were made of chemical industry workers in boric acid production, who were exposed to: SOUND (no other data), HEAT (no other data), BORIC ACID and various TOXIC CHEMICALS (not specified); in various patterns of combined ex- posure on the job. The joint stresses enhance the losses of hear- ing (audiometric) , beyond exposure to sound alone. It recommended that in the establishment of industrial microclimate standards, that permissible levels (at least of sound) be lowered when combined stresses are encountered.		
18.		
19. KEY WORDS heat, sound, boric acid, combined stresses, toxic chemicals chemical industry, toxic chemicals, hearing loss, permissible level standards, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A01G1
4. TITLE (and Subtitle) Radiosensitivity of Animals Exposed to Ionizing Radiation in a Modified Gaseous Medium ***		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Vasin MV, Lvova TS, Antipov VV, Davidov BI, Koroleva LV, Petrukhin SV		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS (Site not Given), USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 4P 11R
14. PUBLICATION Radiobiol (USSR) 1979 (5);19:712-715		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In several laboratory experiments, rats, mice, dogs (no other data provided) were exposed to: RADIOPROTECTIVE AGENTS, Cystamine at 100 mg/Kg, or Mexamine at 25 mg/Kg, given 3-5 min before GAMMA RADIATION from <sup>60</sup> Co, 700-1100 R, with subjects in OXYGEN 100% atmosphere (sea level). Observations were made of 30-day survival, life span, hematology. Oxygen decreased the radioprotective effect of cystamine or mexamine (5-methoxytryptamine) in animals (not specified), with faster development of leucopenia and more pronounced intestinal syndrome.		
18.		
19. KEY WORDS radioprotective agents, gamma radiation, combined stresses, cystamine, mexamine, 5-methoxytryptamine, radiation sensitivity, leucopenia, intestinal syndrome, radiation sickness, interactive responses		
20. NOTES *** Title contd.: "...1. Effect of Breathing Pure Normobaric Oxygen During Irradiation on Radioresistance and Effectiveness of Radioprotective Agents" (Rus)		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0014
4. TITLE (and Subtitle) Ketamine and Thiopental Sleep Responses in Guinea Pigs in Hyperbaric Helium-Oxygen		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) McCracken LE, Nicodemus HF, Tobey RE, Bailey RC		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Med Res Instit Bethesda MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NM RT M99PN001.1200 & M4306.02.5012
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 10P 15R
14. PUBLICATION Undersea Biomed Res 1979 (4);6:329-338		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, guinea pigs were exposed to: KETAMINE at 1-25 mg/Kg or THIOPENTAL at 2-3 mg/Kg each iv, then these treatments: Air at 1 ATA, He-O <sub>2</sub> at 1 ATA, Heliox at 20 ATA, Heliox at 31 ATA. Hyperbaria increased the induction doses re- quired and decreased the duration of sleep. There was less press- ure antagonism with ketamine than thiopental.		
17.		
18.		
19. KEY WORDS ketamine, thiopental, hyperbaria, combined stresses, anesthesia, helium, heliox mixtures, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0048
4. TITLE (and Subtitle) Dose-Responses of Guinea Pigs to Diazepam at Recompression Depths		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER NMRI-80-6
7. AUTHOR(s) Nicodemus HF, Bailey RC, Summe JP, McElroy H		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Med Res Instit Bethesda MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NM RT M009PN001.1200
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 7P 13R
14. PUBLICATION Undersea Biomed Res 1980 (Mar);7:1-7		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, guinea pigs (M) were exposed to: DIAZEPAM at 0.02-2.0mg/Kg iv, after exposure to HYPERBARIA, with compression at 0.1 ATA/sec to either 3ATA of oxygen or 3-6 ATA of air. Duration of sleep was observed. There is a shorter duration of sleep in the hyperbaric groups. Less drug was needed to induce sleep in hyperbaric air at 3 ATA and more was needed in hyperbaric oxygen. Synergism may not be evident when thresholds for stimulating effects of pressure are exceeded.		
17.		
18.		
19. KEY WORDS hyperbaria, diazepam, combined stresses, sleep, compression, hyperoxia, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0316
4. TITLE (and Subtitle) Acute Toxicity of Histamine and Tripelelennamine in Animals Exposed to Hyperbaric Helium		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Small A, McElroy HW, Ide RS		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Med Res Instit Bethesda MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NM RT M4306.02-5011
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 8P 17R
14. PUBLICATION Toxicol Appl Pharmacol 1973;26:418-425		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT <p>In laboratory experiments rats (SD) and guinea pigs (Hartley) were exposed to HYPERBARIA, equilibrated to He 19 ATA + O<sub>2</sub> 0.2 ATA. Rats also received TRIPELENNAMINE IV to doses of about 8.6 mg/Kg, and guinea pigs received HISTAMINE toward lethal dose of 300 ug/Kg, but halted at onset of cardiac arrhythmias induced by asphyxia. There was no effect of hyperbaric He 19 ATA + O<sub>2</sub> 0.2 ATA on the toxicity of tripelelennamine in rats, nor on the toxicity of histamine in guinea pigs; but TPA toxicity studies in guinea pigs suggests that hyperbaric He has a potentiating effect on response.</p>		
17. KEY WORDS <p>hyperbaria, tripelelennamine, combined stresses, asphyxia, arrhythmia, interactive responses</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0065
4. TITLE (and Subtitle)  Toxicology of Hypobaric and Hyperbaric Environments		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Small A, Friess SL		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Med Res Instit Bethesda MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NMR 4306.02.5011 BXK9 & 041.06.01-0006 BCKX
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 24P 150R
14. PUBLICATION  Essays Toxicol 1975;6:101-124		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT This review discusses exposure conditions from 0.3 ATA-200 ATA. The comparative biological effects of hyperbaria alone are considered, along with the biological effects of inert gases. The combined factors of altered pressures and inert gases on toxicity of such exogenous agents as carbon monoxide, ozone, nitrogen dioxide, carbon tetrachloride are discussed. Problems encountered in these atmospheres with therapeutic agents such as morphine, digoxin, anesthetics (including anesthetic reversals) and the pharmacological therapy of decompression sickness are all reviewed.		
17. KEY WORDS hyperbaria, toxic substances, combined stresses, anesthesia, therapeutic drugs, decompression sickness, oxygen toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0243
4. TITLE (and Subtitle) Combined Effects of Noise and Ototoxic Drugs		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Falk SA		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIEHS, Res Triangle Pk NC		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 18P 80R
14. PUBLICATION Environ Hlth Perspect 1972 (10);2:5-22		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT This review includes these topics: legislation concerning noise; noise-induced "ototoxicity" considering trauma vs continuous exposure, permanent damage conditions, dependence on sound spectrum, modes of destruction and pathology; drug-induced ototoxicity, for salicylates and quinine, for diuretics (eg ethacrynic acid, furosemide) and related cochlear damages with swollen endothelial cells, mitochondrial pathology, also for aminoglycoside antibiotics (streptomycin, kanamycin, neomycin, gentamycin), with discussions of changes in endolymph electrolytes, aggravated problems in renal failure. Also discussed is combined stress ototoxicity, and of possible synergies and sensitization by noise of hair cells to antibiotics damage. Speculations are included about cochlear vasoconstriction, endocochlear potential changes, membrane permeance alteration, and Na/K ATPase inhibition-		
19. KEY WORDS sound, ototoxic drugs, combined stresses, hearing, cochlear damage, ototoxic drugs, salicylates, diuretics, aminoglycoside antibiotics, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0362
4. TITLE (and Subtitle) Combined Effects of Noise and Neomycin on the Cochlea		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Jauhianen T, Kohenen A		8. CONTRACT OR GRANT NUMBER(s) G: Finl Nat Counc Med Sci
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Univ Helsinki Hosp Otolar		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 4P 7R
14. PUBLICATION Acta Otolaryngol (Stockh) 1973;73:387-390		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
17. EXTRACT In laboratory experiments, guinea pigs (20+) were exposed to: SOUND (S), 115 db, filtered noise of 1 octave centered at 8 KHz for 70 hr; and NEOMYCIN (A) at 200 mg/Kg im 1/day for 7 days. The 8 KHz frequency was selected to produce damage, if any, to basal turn of cochlea, where hair cell damage has been max after neomycin. Treatments were: S, A, S + A. Studies were made of cochlea 2 wks after treatment. Each agent caused loss in cochlear potential, mapped as cochleogram; combined losses are greater than the 2 losses summed. Histological damage also is much greater than simply additive. Neomycin may sensitize the hair cells and enhance their response to mechanical trauma.		
18. KEY WORDS sound, neomycin, aminoglycoside antibiotic, combined stresses, chemical toxics, hair cells, cochlea, hearing loss, pathology, interactive response		
19. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0223
4. TITLE (and Subtitle) Aminooxyacetic Acid Protects Against Noise-Induced Cochlear Hair Cell Loss		5. TYPE OF REPORT & PERIOD COVERED abstract
7. AUTHOR(s) Bobbin RP, Guth MS, Mines AB		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS La State Univ Med Ctr Dept Otolar, Kresge Hrg Res Lab, New Orleans		8. CONTRACT OR GRANT NUMBER(s) G: NIH NS 11647 G: NIH NS 10463
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION J Acoust Soc Am 1975 (Suppl 1); 58:589 (abstract)		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 1P no R
		15. SECURITY CLASS. (of this report)
16. EXTRACT In laboratory experiments, guinea pigs were pretreated with: AMINOXYACETIC ACID (AOAA) at 20 mg/Kg sc, then exposed to SOUND (S) at 126 db, 4 KHZ sine, for 30 min. They were sacrificed at 21 days and hair cells counted. There was a lower loss of hair cells with AOAA + S than with S alone. There are speculations about the relationship of endocochlear potentials and noise-induced hair cell destruction. No other information is available.		18. DISTRIBUTION
19. KEY WORDS sound, aminooxyacetic acid, combined stresses, hearing loss, cochlear damage, hair cells, toxicity, chemicals; protectants, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0282
4. TITLE (and Subtitle) Combined Effects of Noise and Kanamycin		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Dayal VS, Kokshanian A, Mitchell DP		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS CANADA: Univ Toronto Fac Med Dept Otolar and Hosp for Sick Children		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1971
		13. NUMBER OF PAGES AND REFS 6P 24R
14. PUBLICATION Ann Oto Rhino Laryngol 1971;80:897-902		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, guinea pigs were exposed to: SOUND (S) 68-72 db, 125 Hz (as found in their baby incubators); and KANAMYCIN (A) at 15-100 mg/Kg. 1/day for 3, 5 wk. A alone at 15, 50, or 100 mg/kg for 3 or 5 wk showed here no significant hair cell loss on any repeated turns. S alone for 5 wk caused 17 only small hair cell damage. S + A (15,50 mg/Kg) for 3 wk caused no hair cell loss; but S + A (50) for 5 wk yielded the worst damage to outer hair cells. A(100) for 5 wk caused no substantial loss; S + A (100) for 3 wk caused early and extensive hair cell damage. 18.		
19. KEY WORDS sound, kanamycin, combined stresses, aminoglycoside antibiotics, toxicity, chclear damage, hearing, hair cells, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0218
4. TITLE (and Subtitle) Noise and Kanamycin Interaction in Guinea Pig Cochlea		5. TYPE OF REPORT & PERIOD COVERED abstract
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Hawkins JE Jr, Marques DM, Clark CS		8. CONTRACT OR GRANT NUMBER(s) G: NIH NS P5785-20 C: NIH ES 1-ES-2-2110
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Mich Schl Med, Hrg Res Inst Ann Arbor		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 1P no R
14. PUBLICATION J Acoust Soc Am 1975 (Suppl 1);58:589 (abstract)		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, guinea pigs were exposed to: SOUND (S), at 90, 100, 106 dbA; in octave bands at 0.1, 2, 8 KHz or with broadband noise, for 8 hr/day and 7 days; also KANAMYCIN, at 100 mg/Kg sc 1/day (A). Treatments were: S, A, or S + A. Cochlear injuries studied included reduction in cochlear microphonics or neural potentials, and loss of hair cells. S + A showed interactive effects (potentiation) at S levels over 100 db in some animals for most frequencies; but at 0.5 KHz, even at 112 db, which damages turn 3 in cochlea, there was no enhancement of damage by the A at this region.		
17. KEY WORDS sound, kanamycin, combined stresses, hearing loss, hair cells, cochlea, microphonics, aminoglycoside antibiotics, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0005
4. TITLE (and Subtitle) Combined Effects of Noise and Kanamycin. Cochlear Pathology and Pharmacology		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Brown JJ, Brummett RE, Fox KE, Bendrick TW		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Oreg Hlth Sci Ctr, Kresge Hrg Res Lab, Portland		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Arch Otolaryngol 1980 (Dec);106:744-750		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 6P 31R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
<p>16. EXTRACT</p> <p>In laboratory experiments, guinea pigs (50, 25-450 gm) were exposed to: SOUND, 115 dbA white noise 10 hr/day for 7 days (S); and KANAMYCIN antibiotic (A) at 200, 300, 400 mg/Kg sc 1/day for 7 days, given before exposure to sound. Treatments were: S, A (200, 300, 400), and S + A (200, 300, 400) given in 7 days exposure, then 30-40 days to stabilize any damage. Cochlear damage was determined by electrophysiological and morphological technics. S + A (300 mg/kg) show cochlear damage 4 x the sum of either stress alone (synergy), to outer hair cells, which are destroyed by S or A alone. A at 400 mg/Kg alone causes severe effects, more than 2 x 200 mg/Kg doses, and could mask S effects in combined exposure. S itself does not change pharmacokinetic effects, but may change local vascular sufficiency, producing hair cell ischemia and hypoxia.</p>		
<p>19. KEY WORDS</p> <p>sound, neomycin, combined stresses, aminoglycoside antibiotics, toxicity, cochlear damage, hair cells, hearing loss, interactive responses.</p>		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0135
4. TITLE (and Subtitle) Cochlear Changes from Noise, Kanamycin, and Aging. 2. Potentiating Effects of Noise and Kanamycin		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Dayal VS, Farek WG		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS CANADA: Univ Toronto Fac Med Dept Otolar		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 5P 12R
14. PUBLICATION Laryngoscope 1975 (suppl 1);85:8-12		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
17. EXTRACT In laboratory experiments, guinea pigs (M, 35+) were exposed to: SOUND, 90 db OAL, white noise (down to 63 db at 35.5 Hz+octave, and 52 db at 31,500 Hz+ octave), from loudspeaker, for 5 wk (S); and KANAMYCIN, at 100 mg/Kg (route not avail) 1/day for 5 wk (A). Treatments were: S, A, S + A. Combined exposure with S + A has a potentiating damage effect, with max damage over 1 KHz. Hair cell losses occur in two places in the cochlea: at the apex, in the third row of outer hair cells (OHC), and in rows 1 and 2 of OHC.		
18.		
19. KEY WORDS sound, kanamycin, combined stresses, hearing, hair cells, cochlea, interactive responses, aminoglycoside antibiotics		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0004
4. TITLE (and Subtitle) Combined Effects of Noise and Neomycin. Cochlear Changes in the Guinea Pig		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Brown JJ, Brummett RE, Meikle MB, Vernon J		8. CONTRACT OR GRANT NUMBER(s) G: NIH NS-P9889
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Oreg Hlth Sci Ctr, Kresge Hrg Res Lab, Portland		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 8P 22R
14. PUBLICATION Acta Otolaryngol (Stockh) 1978;80:394-400		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, guinea pigs (32) were exposed to: SOUND, 115 dbA broad band white noise, 10 hr/day for 7 days (S); and NEOMYCIN antibiotic (A) at 200 mg/Kg sc 1/day for 7 days, given before exposure to sound. Treatments were: A + S, S, A, in 7 days exposure, then 30-40 days to stabilize any damage. Coch- lear potential was recorded using sound stimulation at 16 freq- uencies 100 Hz-20 KHz, and histopathology to show any missing hair cells. S alone caused 16 db loss, A alone caused k7 db loss, and may interfere with lipids relating to otolith permeability. S or A damage different parts of the cochlea. S + A have a marked inter- action, causing 62 db loss, and nearly 100% hair cell loss (the S hair cell loss is 18%, the A hair cell loss is 25%).		
19. KEY WORDS sound, neomycin, combined stresses, aminoglycoside antibiotics, toxicity, cochlear potentials, hair cells, hearing loss, inter- active responses.		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0219
4. TITLE (and Subtitle) Combined Effects of Ultrasonic Exposure and Protein Deficient Diet on Both Maternal and Fetal Mice		5. TYPE OF REPORT & PERIOD COVERED abstract
7. AUTHOR(s) Kim HL		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Ill Urbana		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
12. REPORT DATE 1981		13. NUMBER OF PAGES AND REFS 1P no R
14. PUBLICATION Dissert Abstr Intl 1981 (May) 41:4067-B		15. SECURITY CLASS. (of this report)
16. EXTRACT In laboratory experiments, mice (LAF1/J) were exposed to: ULTRASOUND (diagnostic equipment, no other data) applied to mothers and fetuses not at term; also PROTEIN-DEFICIENT DIET with content well below the 20% casein/15% fat components optim- um for fetal growth. Ultrasonic exposure under deficient diet conditions (marginally) decreased fetal and placental weight gains, and cell DNA/RNA content.		15. DISTRIBUTION
18.		
19. KEY WORDS ultrasound, protein deficiency, combined stress, pregnancy, fetal growth, placental barrier, liver pathology, diagnostics, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0043
4. TITLE (and Subtitle) Reduction in Swimming Time in Mice Through Interaction of Infrasound and Alcohol		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Lehmann AG, Busnel RG		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FRANCE: Lab Acoustic Physiol, INRA Jouy-en-Josas		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 6P 21R
14. PUBLICATION  Psychopharmacol 1979 (1);65:79-84		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, mice (one group normal, resistant to audiogenic seizure, second group GFF genetically deaf subline, verified by cochlear microphonics and evoked potential) were exposed to: SOUND, either 60 db at 10 KHz or 100-106 db at 6-50 Hz (infrasound) from speakers, for 2 hrs before swimming; also 17. ETHANOL, 275-340 mg/Kg in 10% soln, given 0.5-3.0 hr before swimming (this dose produces very low blood levels, 15-25 mg%); EXERCISE, swimming time survival, with weight tied onto tail. Eth alone had no significant effects on swimming, nor did infrasound. Alcohol interactions (occurring only when ingested within 18. 90 min before or at same time as 2nd event): Eth + infrasound have additive effects on reduced swim time; infrasound aggravates Eth. effect, prolongs Eth impairment in deaf mice (so non-auditory autonomic change) and normals; no interaction between Eth + 10 KHz S.		
19. KEY WORDS sound, infrasound, ethanol, exercise, combined stresses,, high frequency sound, survival, fatigue, non-auditory responses to sound.		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0035
4. TITLE (and Subtitle) Liver Changes Under Combined Effects of Occupational Environmental Factors		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Ivanovich E, Antov G, Kazakova B		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS BULGARIA: Instit Hyg & Occup Dis, Sofia		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 7P 13R
14. PUBLICATION Int Arch Occup Environ Hlth 1981 (1);48:41-47		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (170 M albino) were exposed to: VIBRATION (V) 0.1 mm amplitude, 40-100 Hz, whole body, direction uncertain, 2 hr/day x 10 day; SOUND (N) 105 dbA, white noise, 2 hr/day x 10 day; HEAT (H) 35° C (45-55% RH, 0.2-0.3 M/sec air) 2 hr/day x 10 day; and LEAD ACETATE (Pb) 20 mg/Kg oral, 1/d x 10d. 17. Treatments included V+N, V+H, V+C. Liver changes: morphology, enzymes (eg succinic dehydrogenase, LDH, ATPase), soluble proteins and chemistry (in slices) were measured. V causes no marked change in chemistry and enzymes, but induces vascular disorders and degenerated hepatocytes, disturbed ultrastructure and organization 18. of cells. Pb causes most severe changes, altering all measurables. H increases ATPase and SDH. N increases ATPase and SDH. V + Pb cause large changes, harmful to ultrastructure, mitochondria, and accounts for disturbed energy supply and use in liver, synergy. V+N give big changes in all factors xc SDH.		
19. KEY WORDS vibration, noise, heat, lead, combined stresses, liver pathology, energy metabolism, SDH, LDH, ATPase, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0058
4. TITLE (and Subtitle) Core Temperature Changes Following Administration of Naloxone and Naltrexone to Rats Exposed to Hot and Cold Ambient Temperatures.		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Thornhill JA, Cooper JE, Veale WL		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS CANADA: Univ Calgary Fac Med Div Med Physiol		8. CONTRACT OR GRANT NUMBER(s) G: Canad MRC
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 4P 7R
14. PUBLICATION  J Pharm Pharmacol 1980; 32:428-430		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments examining the role of endorphins in hot and cold acclimatization, rats (M SD) were exposed to: COLD and HEAT 4° C and 38° C for 1, 4, 12, 24, 48 hr before drug administrations; and NALOXONE HCl or NALTREXONE HCl (N) (narcotic antagonists), 10 mg/kg sc. N altered temperature responses to rats acutely exposed to cold or heat. T <sub>core</sub> dropped in cold and rose in heat. These Ns may block brain endorphins and ability to respond homeostatically to thermal stresses.		
17.		
19. KEY WORDS heat, cold, naloxone, naltrexone, combined stresses, thermoregulation, endorphins, narcotic antagonists, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0099
4. TITLE (and Subtitle) On the Combined Effect of Tritium Oxide, Noise, and Heat on Rats (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Tsapkov MM, Kalistratova VS, Tishchenko GS		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Unnamed site, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 3P 10R
14. PUBLICATION  Radiobiol (USSR) (2);22:275-277		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT <p>In laboratory experiments, rats (F, random bred) were exposed to: TRITIUM OXIDE (T<sub>2</sub>O) 22.MBq/g, IP 1 time with dose 10 X max permissible level; SOUND, at 100-103 db (freq not avail) 3 hr/day for 60 days; and HEAT, 40° C 2 hr/day, for 60 days. Treatments included: T<sub>2</sub>O, T<sub>2</sub>O + S, T<sub>2</sub>O + H, T<sub>2</sub>O + S + H. T<sub>2</sub>O alone made no change in liver glycogen or serum cholinesterase. T<sub>2</sub>O + S caused decrease of serum cholinesterase by day 14, and glycogen content of liver. T<sub>2</sub>O + H or T<sub>2</sub>O + S + H increased liver glycogen. No other data are available.</p>		
18.          		
19. KEY WORDS <p>tritium oxide, sound, heat, combined stresses, cholinesterase, liver glycogen, interactive responses.</p>		
20. NOTES          		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0078
4. TITLE (and Subtitle) Combined Effect of Ionizing Radiation and Certain Other Factors (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Dobrovolsky LA		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Kiev Sci Instit Hyg, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 6P 21R
14. PUBLICATION  Vrach delo (USSR) 1981 (12);11-16		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT This is a brief review of problems of combined stress exposures and of estimation of interacting responses. Factors mentioned include: IONIZING RADIATION; HEAT; NON-IONIZING RADIATION, including "short wave" and SHF; OZONE; CARBON MONOXIDE, OTHER TOXIC CHEMICALS, lead, chloroprene, formaldehyde. Specific events in interaction of ionizing radiation and heat, and responses in body weight, fertility are discussed; and the changes in nature of the interaction as functions of exposure, dosages, and eg energy of radiation are considered.		
17.		
18.		
19. KEY WORDS ionizing radiation, non-ionizing radiation, heat, toxic chemicals combined stresses, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0165
4. TITLE (and Subtitle) Effect of Environmental Temperature and Humidity on Lead Poisoning in Animals		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Baetjer AM, Joardar SN, McQuary WA		8. CONTRACT OR GRANT NUMBER(s) G: PHS RG-4505
9. PERFORMING ORGANIZATION NAME AND ADDRESS Johns Hopkins Univ Schl Hyg & Publ Hlth Baltimore MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1960
		13. NUMBER OF PAGES AND REFS 15P 24R
14. PUBLICATION  Arch Environ Health 1960 (6);1:463-477		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
18. EXTRACT In laboratory experiments mice, and rats (for excretion studies only) were exposed to: LEAD acetate, acute doses 2.2-4 mg Pg per 20 g mouse, ip or iv; or chronic doses 0.2-0.6 mg/20 g 5x/wk ip. HEAT stress, to 95° F was also used. Treatments were: 3-5 days in temp chamber at selected level, then Pb injection; or acclimatization at one temp in chamber for varying periods, Pb dose, then new temp exposure; or chronic Pb dose at 70° F then exposure to chamber temp stresses; or high temperature and dehydration (water intake restriction 3 days to 12% loss), then at high temp Pb given. Pb IP mortality has higher with heat than normal temp. There was no acclimatization with longer heat exposure. In chronic exposures, heat kills faster, high Rel Hum has no effect. Dehydration facilitates effects. Heat increases susceptibility to Pb by any route. In heat, less Pb is excreted in urine.		
19. KEY WORDS lead, heat, combined stresses, humidity, dehydration,, toxicity, metabolism, acclimatization, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0253
4. TITLE (and Subtitle) Susceptibility to Lead Toxicity		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Goyer RA, Mahaffey KR		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ NC Schl Med Dept Path Chapel Hill		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 8P 50R
14. PUBLICATION Environ Health Perspect 1972 (10);2:73-80		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT This surveys briefly the following topics: Metabolism of Pb, oral intake, distribution in rbc, liver, etc., excretion; Toxic effects of Pb; Factors influencing susceptibility to Pb toxicity including age, season, Ca, Pa, Fe deficiency, diet, vitamin D, protein intake, ascorbic acid, nicotinic acid, alcohol, other metals, coexistent disease, Hb anomalies, and certain metal-metal synergies.		
18.		
19. KEY WORDS lead, iron deficiency, cadmium, combined stresses, toxicology, intranuclear inclusion, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0252
4. TITLE (and Subtitle) Pathological Effects of Lead		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Goyer RA, Rhyne BC		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ NC Sch Med Dept Pathol Chapel Hill		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 78P 263R
14. PUBLICATION  Int Rev Exp Pathol 1973;12:1-77		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT The principal topics discussed are: Lead in the Environment, its sources, ecodiagrams. Pb Balance and Retention, Body Burden: quantitative aspects, routes of absorption and excretion; GI, pulmonary, kidney, blood content. Cell Response to Pb: intranuclear inclusions, mitochondrial effects, 17. protein synthesis, cytogenetic effects. Neuropathology: encephalopathy, peripheral neuropathy, neurological sequels of intoxication, subclinical and asymptomatic events. Hematology: rbc morphology, functional effects on rbd, hemolytic effects, inhibition of heme synthesis. 18. Renal: human nephropathies, experimental nephropathy. Effects on Other Organ Systems: reproductive, endocrine, immune. Factors altering dose-response susceptibility: age, season, Ca and P, protein in diet, vitamins, alcohol, Fe deficiency, synergism with metals (Cd, Hg, Zn, Al).		
19. KEY WORDS  lead, toxicology, neuropathology, hematology, metal antagonism, metabolism, nuclear inclusion bodies, interactive responses, body burden		
20. NOTES		

METALS  
COMBINED STRESS EXTRACTS



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0073
4. TITLE (and Subtitle) Effect of Cholinomimetics on the Development of Hypothermia (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Bazhanov NO, Salyaev VN		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Yaroslav Med Instit Pharmacol Dept USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 4P 8R
14. PUBLICATION Farmakol Toksikol (USSR) 1981 (Jan-Feb);44:40-43		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
<p>16. EXTRACT</p> <p>In laboratory experiments, rats (M, random-bred) were exposed to: COLD, at 7° C, water immersion; and CHOLINOMIMETIC, other drugs, including nicotine (4 mg/kg), methacine (20 mg/kg) + proserine (0.45 mg/kg), methacine (20 mg/kg) + arecoline (20 mg/kg), or pilocarpine (25 mg/kg) all given IP. Trect defined for mild hypothermia was 33° C, for moderate 26° C and for deep 19° C. All drugs given decreased rate of development of hypothermia (RDH), in various levels of effect. A variety of differential effects were seen of drug actions on RDH and level of hypothermia. A drop of RDH in mild HT and RDH rise during deep HT may be associated with reversion of sensitivity of cholinergic receptors to acetylcholine, so with antihypothermic effects of cholinomimetics during hypothermia, compared with hypothermic effects during normothermia.</p>		
<p>19. KEY WORDS</p> <p>cold, cholinomimetic drugs, combined stresses, hypothermia, nicotine, arecoline, methacine, proserine, pilocarpine, interactive responses</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0188
4. TITLE (and Subtitle) Five-thio-d-glucose, Hypothermic Responses in Mice		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Francesconi R, Mager M		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Army Res Instit Envir Med Natick MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 5P 15R
14. PUBLICATION Am J Physiol 1980 (8);239:R214-R218		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments, mice were exposed to: 5-THIO-D-GLUCOSE at 20 mg IP (also 100 ug into cerebral ventricles or COLD, at 4° C and 22° C. After the drug, at 22° C there was a marked hypothermic response, not normalized after 4 hr. Rectal temperature dropped, in a dose-dependent way; after 30 min 17 cold exposure enhanced the drop, and hypothermia led some to death. With the hypothermia caused by 5TG comes a central and peripheral <del>cell</del> glucopenia, along with circulating hyperglycemia. 18.		
19. KEY WORDS cold, thioglucose, combined stresses, hypothermia, thermogenesis, glycolysis, hyperglycemia, core temperature, interactive response		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER
		A0327
4. TITLE (and Subtitle)		5. TYPE OF REPORT & PERIOD COVERED
L-Tryptophan: Effects on Body Temperature in Rats		Jnl article
		6. PERFORMING ORG. REPORT NUMBER
		7. CONTRACT OR GRANT NUMBER(s)
7. AUTHOR(s)		
Francesconi RP, Mager M		
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
US Army Res Instit Envir Med Natick MA		
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE
		1974
		13. NUMBER OF PAGES AND REFS
		4P 32R
14. PUBLICATION		15. SECURITY CLASS. (of this report)
Am J Physiol 1974 (2);227:402-405		
		15. DISTRIBUTION
16. EXTRACT		
<p>In laboratory experiments, rats were kept in chamber at 21° C for 1 wk before exposure to: COLD and HEAT, at 4° C, 10° C, 17° C, and 31° C; or given L-TRYPTOPHAN, at 200 or 600 mg/Kg IP, in various combinations. There was a rapid hypothermic response to tryptophan, generally highly chemospecific, with toxic effects on organs of heat production, also non-specific effects on vessels. At 4° C, the drug inhibits the increased heat production necessary to maintain body temperature. There was no effect on oxygen consumption at 31° C nor effect on glucose levels.</p>		
17.		
18.		
19. KEY WORDS		
heat, cold, l-tryptophan, combined stresses, hypothermia, thermogenesis, metabolism, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0328
4. TITLE (and Subtitle) Hypothermia Induced by 5-Thio-D-Glucose: Effects on Treadmill Performance in the Rat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Francesconi RP, Mager M		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Res Instit Envir Med Natick MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 5P 25R
14. PUBLICATION  Aviat Space Environ Med 1980 (8); 51:754-758		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (M Charles River) had hypo- thermia preinduced with 5-THIO-D-GLUCOSE, at 10 mg in saline iv (incomplete data). They were kept in COLD at 4° C, restrained. T <sub>rect</sub> fell to 29-30° C. They were then moved to HEAT, 35° C environment, and given EXERCISE on a treadmill to hyperthermic 17 exhaustion (T <sub>rect</sub> of 41.5-43° C). The hypothermia lengthened the time to hyperthermic exhaustion; it improves endurance, but homeostatic mechanisms bring the T <sub>rect</sub> back. The 5TG also in- duced a hyperglycemia, which reverted to control levels after heat stress. 18.		
19. KEY WORDS 5-thio-d-glucose, cold, heat, exercise, combined stresses, heat exhaustion, endurance, hyperglycemia, thermoregulation, thermogenesis, hypothermia, hyperthermia, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0032
4. TITLE (and Subtitle) Potentiation of Chemically Induced Lung Fibrosis by Thorax Irradiation		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Haschek WM, Meyer KR, Ullrich RL, Witschi HP		8. CONTRACT OR GRANT NUMBER(s) C: DE-Hlth & Envir Res W7405eng26 to UC
9. PERFORMING ORGANIZATION NAME AND ADDRESS Oak Ridge Nat Lab Biol Div, TN; Univ Tenn-OR Grad Schl Biomed Sci, TN		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 17P 22R
14. PUBLICATION Int J Radiat Oncol Biol Phys 1980 (Apr);6:449-455		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, mice were exposed to: X-RADIATION, 300 Kvp, at 265 rad/min, total doses of 50, 100, 200 rad, to thorax (with rest of body shielded to 1% dose level); and BUTYLATED HYDROXYTOLUENE (BHT), at 300, 400 mg/kg IP. When BHT is given alone, 2-4 days later there is extensive proliferation of Type II alveolar cells; 2 wks later lung collagen (hydroxyproline meast) has increased, with response BHT dose-dependent. BHT + X-rays has a synergistic effect, yielding much more collagen (hydroxyproline) in alveolar septa than either treatment alone. If given x-rays 6 days post BHT the lung collagen is not increased. Fibrosis develops when lung is damaged by a blood borne agent, (such as BHT, silica dust, 95% O <sub>2</sub> ) and radiation given when these events compromise re-epithelialization. No fibrosis change occurs from x-rays during proliferation of capillary endothelial cells or interstitial cells.		
17. KEY WORDS butylated hydroxytoluene, x-radiation, combined stresses, BHT, collagen, fibrosis, hydroxyproline, alveolar Type II cells, epithelialization, interacting responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO. ADA076026	3. CATALOG NUMBER A0014
4. TITLE (and Subtitle) Microwave Radiation and Chlordiazepoxide Synergistic Effect on Fixed-Interval Behavior		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER NMRI-79-18
7. AUTHOR(s) Thomas JR, Burch LS, Yeandle SS		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USN Med Res Instit Bethesda MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NM WRU Z51.524.015.0042
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 2P 15R
14. PUBLICATION  Science 1979 (30 Mar);203:1357-1358		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats maintained at 23° C were exposed to: CHLORDIAZEPOXIDE (C), 1-40 mg/Kg IP in saline 30 min before radiation, and: MICROWAVE RADIATION 2.45 GHz, 1 mW/cm <sup>2</sup> , pulsed, rep freq 500 Hz, pulse width 2 usec for 30 min. A fixed interval reinforcement schedule (FI) was used, with lever pressing for pellets, done for 1 hr immediately after radiation, with 3 replicates/dose. With C alone FI increases with dose. Effects of C are modified by MR. Brief exposure to MR acts synergistically with C, in effects on behavior, by unknown non-thermal mechanism.		
17. KEY WORDS chlordiazepoxide, microwave radiation, combined stresses, operant conditioning, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0083
4. TITLE (and Subtitle) A Means of Quantitative Assessment of the Joint and Complex Action on the Body of Chemical and Physical Environmental Factors (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Kagan YS		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Res Instit Hyg & Toxicol, Kiev, USSR		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 3P 2R
14. PUBLICATION  Gig sanit (USSR) 1973 (2);89-91		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT This methods report briefly discusses probit analyses of quantitative effects of combined exposures to two or more stressors, physical or chemical, administered by diverse routes. A modification of Finney's method is discussed. This allows cal- culation of combined additive effects, based on % of LD <sub>50</sub> for example, and comparison with actual data to determine whether synergy or antagonism of effects are present. Specific examples using marker enzymes are considered.		
17.		
18.		
19. KEY WORDS probit analyses, Finney's method, additive effects, combined stresses, synergism, antagonism, interactive responses.		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0075
4. TITLE (and Subtitle) Effect of Biological Interaction between Dibutylphenylphosphate and Microwave Radiation at 2400 MHz (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Belkin VI, Tikhonchuk VS		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Unnamed site, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 2P 6R
14. PUBLICATION  Radiobiol (USSR) 1980 (2);623-624		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments briefly described, mice (400 M albino) were exposed to: DIBUTYLPHENYLPHOSPHATE (DPP) (dose not available) applied to intact skin of tail for 0.5, 1.0, 2.0, 3.0 hr; also MICROWAVE RADIATION, 2,400 MHz, 800 mW/cm <sup>2</sup> , for 35 sec (probably whole body). DPP and MR had an additive effect: inhibition of blood cholinesterase within 2 wk after joint exposures and decrease in survival rate in first 8 hr after MR exposure depended on the duration of exposure to DPP. Empirical exponential equations are set down for lethality and cholinesterase change.		
17.		
18.		
19. KEY WORDS dibutylphenylphosphate, microwave radiation, combined stresses, DPP, cholinesterase, radiation biology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0080
4. TITLE (and Subtitle) Radiosensitivity and Status of Some of the Organism Systems Affected by Different Biologically Active Chemical Agents (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Goloshchapova ZA, Puchova SM		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Unnamed site, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 5P 8R
14. PUBLICATION Radiobiol (USSR) 1979 (5);697-701		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, mice (C57Bl/6) and rats (albino) were exposed to: RADIOPROTECTIVE AGENTS, including Merkamine, and Ethylthiuronium; and RADIOSENSITIZING AGENTS, including colcemide, diethylether of 2-methylthiasolidine-2,4-dicarboxylic acid; all agents given IP 15 min prior to irradiation at equi- 17 toxic LD50 doses. Also given was GAMMA RADIATION, from <sup>137</sup> Cs at 90 R/min for totals of 600-1,000 R. Measurements, besides survival, included: bone marrow karyocyte count, peripheral wbc count, and mitotic activity in crypts of small intestine. The radiomodifying effect of the agents depended on the severity and 18 rate of recovery from radiation injuries. Karyocyte count was the most sensitive index, and correlated with nucleic acid content in peripheral leukocytes. Agents inducing lesions in radiosensitive tissues increase LD50 up to 80R. Some agents which briefly inhibit metabolism, reduce LD50 to 100-200R		
19. KEY WORDS gamma radiation, radioprotective agents, radiosensitizing agents, radiation biology, combined stresses, mitotic activity, karyocyte count, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0256
4. TITLE (and Subtitle)  Nutritional Factors and Susceptibility to Lead Toxicity		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Mahaffey KR		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  FDA Bur Foods Div Toxicol Wash DC		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 6P 24R
14. PUBLICATION  Environ Hlth Perspect 1974 (5);7:107-112		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT  In laboratory experiments rats were exposed to: LEAD at 200 ug/cc in drinking water for 10 wks; CALCIUM, intake reduced to 20% of recommended; IRON intake reduced, either 5 or 25 ppm. Various combinations were given in diet and drinking water for 10 wks. Blood Pb conc rises when Ca is low. Low diet intakes (20% of recommended) or Ca or Fe increase the toxicity of Pb. Pb at 12 ug/cc in water on 20% Ca in diet has same effects as 200 ug/cc in water when normal Ca is in diet. Max dose of Pb for 10 wk not impairing heme synthesis in rat is 200 ug Pb/cc. Susceptibility to Pb toxicity is affected by age, season (UV, body temperature, dehydration), Ca, P, vitamin D, dietary protein, ascorbic acid, nicotinic acid, alcohol, other heavy metals.		
17. KEY WORDS  lead, undernutrition, combined stresses, diet, toxicity, metabolism, heme synthesis, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0289
4. TITLE (and Subtitle)  Influence of Dietary Factors on Blood and Tissue Lead Concentrations and Lead Toxicity		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Mylroy AA, Moore L, Erogbogbo U		8. CONTRACT OR GRANT NUMBER(s) G: NIH RR-8043
9. PERFORMING ORGANIZATION NAME AND ADDRESS Chicago State Univ, IL		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1977
		13. NUMBER OF PAGES AND REFS 8P 15R
14. PUBLICATION  Toxicol Appl Pharmacol 1977;41:361-367		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (160 Holzman, 15 wk) were exposed to: LEAD acetate at 1 mg Pb/cc in drinking water for 5 wks; and various diets: normal protein diet; or low-protein diet (with 8% casein and 1% alanine) (LP); or LP + 1% cystine; or LP + 1% methionine. Measurements were made of: decrease in growth rate, reduced food use, increased urinary del-aminolevulinic acid, Pb induced anemia (reduced Hb, RBC, hematocrit). The LP diet was associated with severe toxicity and high blood Pb (369 ug %). if methionine or cystine replaced the alanine, this reduced Pb toxicity and blood Pb (without change in tissue Pb concentration). 17. On normal protein diet (27% casein) although there are many signs of Pb toxicity, blood Pb conc is only 1/6 that on low protein diet, and there is no drop in kidney or liver Pb, but there is a rise in bone Pb. On these diets, blood Pb did not mirror tissue Pb or Pb toxicity or Pb exposure: blood Pb as indicator is fallacious.		
19. KEY WORDS lead, undernutrition, combined stresses, diet, toxicology, blood chemistry, del-aminolevulinic acid, anemia, low-protein diet interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0342
4. TITLE (and Subtitle)  Experimental Enhancement of Lead Toxicity by Low Dietary Calcium		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Six KM, Goyer RA		8. CONTRACT OR GRANT NUMBER(s) G:NIH-AM-21061 C:PHS-PH43-68-74
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Univ N Carolina Schl Med Dept Pathol Chapel Hill NC		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1970
		13. NUMBER OF PAGES AND REFS 10P 19R
14. PUBLICATION  J Lab Clin Med 1970 (6);76:933-943		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments Rats (30 SD albino) were exposed to: LEAD at 200 ppm in drinking water for 10 wk (a subclinical toxic level when given with normal diet); CALCIUM gluconate, at 0.1% (deficiency level) or 0.7% (normal dietary level) in diet. These were given in various combinations for 10 wks. The lower 17 Ca level would not be unreasonable in urban poor, and yields increased absorption and urinary excretion of Pb, and increased Pb levels in blood, tissue, bone. There are also more frequent and large intranuclear inclusion bodies, changes in kidney size and tubule cells, etc. 18.		
19. KEY WORDS  lead, calcium, combined stresses, diet, anemia, toxicity, del-aminolevulinic acid, intranuclear inclusion bodies, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0286
4. TITLE (and Subtitle) Dose-Response to Lead Ingestion in Rats Fed Low Dietary Calcium		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Mahaffey KR, Goyer R, Haseman JK		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-481 AM-RG
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ NC Schl Med Dept Path, Chapel Hill		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 9P 17R
14. PUBLICATION J Lab Clin Med 1973 (1);82:92-100		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (74 M SD albino) were exposed to: LEAD acetate at 3-200 ug/cc in drinking water; and CALCIUM gluconate at 0.1% (deficiency) and 0.7% (normal level) given in diet. Various single and combined doses were given with water and diet for 10 wk, then tissue analyses were made. 17. Susceptibility to Pb effects increased, several multiples, by low Ca (0.1%) equivalent to Pb rise of 6-26 ug/cc in water. Low Ca enhances effects of low levels of Pb, as shown by intranuclear inclusion bodies (Pb-protein complexes), femoral and kidney Pb and del-aminolevulinic acid. 18.		
19. KEY WORDS lead, calcium, combined stress, diet, toxicity, nuclear inclusion lead-protein complexes, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0304
4. TITLE (and Subtitle) Protective Value of Dietary Copper and Iron against some Toxic Effects of Lead in Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Klauder DS, Petering HG		8. CONTRACT OR GRANT NUMBER(s) G:NIH-ES-42 G:NIH-ES-159
9. PERFORMING ORGANIZATION NAME AND ADDRESS U Cincinnati Med Ctr Dept Envir Hlth Cincinnati OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 4P 19R
14. PUBLICATION  Environ Hlth Perspect 1975;12:77-80		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT  In laboratory experiments rats (M, SD, weanlings) were exposed to: COPPER at 0.5-8.5 ppm, ZINC at 20-140 ppm, LEAD o-500 ppm, added to drinking water; and IRON at 40ppm added to feed diets. The basic diet with these selected supplements was provided for 12 wks. Dietary Fe + Cu showed the biggest effects, with inverse relation to Pb absorption (measured by Pb in RBC and kidney). 17. Cu levels in kidney drop with lowered Fe in diet, and are depressed by Pb. Pb interfered with hematopoiesis when diet Cu and/or Fe are low. The effect was greater with Cu + Fe. When Cu and Fe are low, there is an increase in RBC Pb. Some toxic effects of 18. Pb are reduced if Cu + Fe + Zn are adequate.		
19. KEY WORDS  copper, iron, lead, combined stresses, diet, metabolism, toxicity, hemopoiesis, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0277
4. TITLE (and Subtitle) Influence of Dietary Copper on Lead Toxicity in the Young Male Rat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Cerklewski FL, Forber RM		8. CONTRACT OR GRANT NUMBER(s) G: NIH GM-653 G: ILL Ag Exp Stat
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Ill Dept Anim Sci, Nutrit Biochem Lab, Urbana		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1977
		13. NUMBER OF PAGES AND REFS 4P 18R
14. PUBLICATION J Nutrit 1977;107:143-146		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (31 M albino, young) were exposed to: COPPER chloride at 1, 5, or 20 ppm (5 is the current diet recommended level for rats); also LEAD acetate from 0-200 ppm. Either or both were given in basic diet. Dietary Cu increased the severity of Pb toxicity. Increases occurred in Pb in kidney; urinary del-aminolevulinic acid, and Cu in liver rose. The interactive effect got stronger with rise in dietary Cu. Other data are presented on interactive effects.		
17.		
18.		
19. KEY WORDS lead, copper, combined stresses, diet, toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0257
4. TITLE (and Subtitle)  Metabolic Interactions: Lead, Calcium, and Iron		5. TYPE OF REPORT & PERIOD COVERED review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Mahaffey KR, Rader JI		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  FDA Bur Foods, Div Nutrit, Wash DC		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 13P 66R
14. PUBLICATION  Ann NY Acad Sci 1980;355:285-297		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT <p>Some special problems in this field are highlighted. Conflicts of data relate to: types of studies, route of Pb and other exposure, mode and content of feeding. Calcium and Lead interactions include: Ca effects on Pb absorption and excretion, on tissue and organ distribution, Ca deficiency and Vitamin D events; Pb influence on Ca metabolism, undernutrition and the childhood Pb burden, and various clinical correlations. Iron and Lead interactions include: Fe effects on Pb absorption and excretion, tissue and organ distribution, various Pb effects on Fe, and clinical correlations. Many of these topics are discussed at length.</p>		
19. KEY WORDS <p>lead, iron, combined stresses, diet, metabolism, interactive responses</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0344
4. TITLE (and Subtitle)  The Influence of Iron Deficiency on Tissue Content and Toxicity of Ingested Lead in the Rat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Six KM, Goyer RA		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ N Carolina Schl Med Dept Pathol Chapel Hill NC		8. CONTRACT OR GRANT NUMBER(s) G:NIH-ES-481 AM-21061
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  J Lab Clin Med 1972 (1);79:128-136		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 9P 5R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory experiments rats (33 M SD albino) were exposed to: LEAD at 200 ug/cc (a subtoxic dose); then one group received IRON as ferrous sulfate at 25 ppm in purified diet also containing Calcium and Phosphorus; the second group received Fe sulfate at 5 ppm (low level). Fe deficiency increased the retention of Pb in liver, kidney, bone and soft tissue; and there was increase of Pb urine excretion and of D-aminolevulinic acid in blood. Fe deficiency also increased, in other studies, the absorption of Mn, Co, and Zn. The Fe deficiency and Pb response are considered synergistic effects.		
19. KEY WORDS  iron, lead, combined stresses, toxicity, diet, del-aminolevulinic acid, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0202
4. TITLE (and Subtitle)  The Synteratogenic Effect of Lead and Cadmium		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Ferm VH		8. CONTRACT OR GRANT NUMBER(s)  G: NIH HD-2616 GM-10210
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Dartmouth Med Schl Dept Anat Hanover NH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1969
		13. NUMBER OF PAGES AND REFS 2P no R
14. PUBLICATION  Experientia 1969 (1);25:56-57		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT  In laboratory experiments hamsters (pregnant, on day 8, where major organ systems are established in a 24 hr period) were exposed to: CADMIUM sulfate at 2 mg/Kg IV; also LEAD acetate at 50 mg/Kg IV by injection of the mother with one or both. Cd alone caused anterior malformations. Pb alone caused tail malformations, as seen in day 13 fetal hamster. The anterior Cd effects were reduced in the presence of Pb. Also the posterior malformations from Pb were potentiated by Cd. Speculations concern whether these are direct effect on embryonic tissues, or a block of some essential placental transfer, or some induced defect in metabolism which affects embryonic tissues. Cd and Pb may interact additively on metalloenzymes in altering the tail bud.		
19. KEY WORDS cadmium, lead, combined stresses, teratogenesis, diet, malformations, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0303
4. TITLE (and Subtitle) Comparative Study of Inorganic Lead and Cadmium on Blood Delta-Aminolevulinate Dehydratase in Man		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Lauwerys RR, Buchet JP, Roels HA		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS BELGIUM: Louvain Univ Industr & Med Toxicol Unit, Brussels		8. CONTRACT OR GRANT NUMBER(s) G; Cmsn Euro.Cmnties
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Brit J Indust Med 1973;30:359-364		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 6P 28R
		15. SECURITY CLASS. (of this report)
16. EXTRACT In occupational observations workers (90 M, 60 F) in storage battery, nickel-cadmium chemical and electronic factories, were exposed to CADMIUM dust, approx 100 ug/m <sup>3</sup> (77 workers), with the other workers (73) selected as controls, without these exposures. No data were provided, but the LEAD and NICKEL exposures are considered to be concurrent. Measurements were made of ALA-D (RBC), and U-ALA, Pb in blood, Pb in urine, Cd in blood, Cd in urine. An inverse relation was found between ALA-D and B-Pb or U-Pb. ALA-D activity was not correlated with B-Cd and the potential effect of Cd on ALA-D in the general population was considered negligible compared with Pb. Cd had no significant effect to depress ALA-D in RBC. But depression of ALA-D in RBC was regarded as a sensitive and specific early warning of Pb in blood. This was the extent of reporting on present work.		
19. KEY WORDS lead, cadmium, combined stresses, battery industry, dust, aminolevulinate dehydratase, electrical industry, nickel, hematology, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0276
4. TITLE (and Subtitle) Influence of Dietary Zinc on Lead Toxicity in the Rat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Cerklewski FL, Forbes RM		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Ill Dept Anim Sci Nutrit Biochem Lab Urbana		8. CONTRACT OR GRANT NUMBER(s) G: NIH GM TG653(trainee) G: ILL Ag Exp Stat
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION J Nutrit 1976;106:689-696		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 8P 41R
		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments rats (M,SD, young) were exposed to: ZINC carbonate at 8, 35, 200 ppm; also LEAD acetate at 50, 200 ppm with one or both added at various doses to semi-purified diet over 7 wks. Another series was fed low Zn basal diet for days 1-7. At day 5, some got Zn IP at 100 ug dose, repeated on day 6, with fasting till day 7. On day 7 Pb 3mg was given in diet, and on day 8 Zn was given. Large dietary loading with Zn (200 ppm) reduced many toxic effects of Pb, in a manner similar to 50 ppm dose. Increase of dietary Zn decreases Pb toxicity, drops Pb levels in blood, liver, kidneys, and bone, reduces excretion of U-ALA, and free RBC porphyrin. Injection of Zn gives no protection against Pb toxicity; major action is by inhibiting Pb absorption at intestinal level. Pb and Zn compete for binding sites on metallothionein enzymes.		
19. KEY WORDS zinc, lead, combined stresses, diet, toxicity, metallothionein, porphyrins, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0326
4. TITLE (and Subtitle) Influence of Dietary Zinc on Lead Toxicity in Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) El-Gazzar RM, Finelli VN, Boiano J, Petering HG		8. CONTRACT OR GRANT NUMBER(s) G; NIH ES-159
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cincinnati Dept Envir Hlth, Kettering Lab, OH; EGYPT: High Instit Pub Hlth Alexandria		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 8P 22R
14. PUBLICATION  Toxicol Lett 1978;2:227-234		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (28 M weanlings) were exposed to: ZINC acetate at 5, 50 ug/cc in dietary drink; also LEAD acetate, at 100 ug/cc in dietary drink. One or both of these were given in various combinations together with semi-purified diet, for over 140 days. Rats on low Zn doses started with slow growth but caught up. Pb raised urine del-aminolevulinic acid, also increased Zn proroporphyrin. High diet Zn reduces Pb levels in various tissues, and lowers U-ALA. Pb reduces Zn levels in plasma, liver, tibia. RBC Zn protoporphyrin (ZPP) is affected by diet Zn also Pb. RBC Pb is highly correlated with ALA, ZPP, and U-ALA. Zn then has a protective role in Pb toxicity. It is not only an antagonist at intestinal absorption sites, but also in tissue at enzyme levels.		
19. KEY WORDS zinc, lead, combined stresses, toxicity, diet, proroporphyrin, del-aminolevulinic acid, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0301
4. TITLE (and Subtitle) Antagonistic Effect in Vivo of Zinc on Inhibition of Delta-Aminolevulinic Acid Dehydratase by Lead		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Haeger-Aronsen B, Schutz A, Abdulla M		8. CONTRACT OR GRANT NUMBER(s) G: Swed.Work Envir Fund
9. PERFORMING ORGANIZATION NAME AND ADDRESS SWEDEN: Lund Univ Hosp Dept Occup Med		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 6P 41R
14. PUBLICATION  Arch Environ Hlth 1976 (7-8);31:215-220		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments rabbits (32, 7F, 25M, white furred breed, ages 1-2 yr) were exposed to: ZINC sulfate at 22.5 mg Zn/cc given sc; LEAD acetate at 28.0 mg Pb/cc given sc. Treatments were: Zn at 63 mg/Kg, then 202 mg/Kg; Pb at 25 mg/Kg, then Zn 200 mg/Kg; or Zn 50 mg/Kg, then Pb 18 mg/Kg. Del-aminolevulinic acid dehydratase is a sulfhydryl enzyme involved in biosynthesis of heme (catalyzes 2 molecules of D-ALA condensing to 1 of porphobilinogen. Activity is inhibited by heavy metals. Zn activated ALAD in vivo, and almost completely inhibited effect of Pb. Pb dose is first followed by suppression of ALAD. ALAD in rbc and Zn in plasma are linked, but there is no correlation between ALAD and Zn in rbc. Zn and Pb have an antagonistic effect on ALAD. Normal ALAD rbc is higher in rabbits than humans, and there are differences in amounts and sites of binding of Pb and Zn in blood.		
19. KEY WORDS  zinc, lead, combined stresses, toxicity, del-aminolevulinic acid dehydratase, heme metabolism, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0018
4. TITLE (and Subtitle) Effect of Mixed Exposure to Lead and Zinc on ALA Level in Urine		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Dutkiewicz B, Dutkiewicz T, Milkowska G		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS POLAND: Silesia Med Schl, Instit Med Chem		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 7P 25R
14. PUBLICATION Int Arch Occup Environ Health 1979;42:341-348		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In occupation observations in the LEAD and ZINC metals industries among workers (97) with 1-9 yr contact, measurements of Pb in blood av 40-100 ug/100 cc. del-aminolevulinic acid (ALA) was over 5 mg/dm <sup>3</sup> in 89 subjects. Mixed exposures to Pb + Zn reduced U-ALA, an antagonist effect. Evaluation of hazards of Pb + Zn must consider Zn serum level and ALA; Zn is essential in ALA bio-synthesis.		
17.		
18.		
19. KEY WORDS lead, zinc, combined stresses, del-aminolevulinic acid, toxicity, lead-zinc industry, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0229
4. TITLE (and Subtitle) Effect of Cadmium on Dose-Response Relationships of Zinc in Rats		5. TYPE OF REPORT & PERIOD COVERED Abstract
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Petering HG, Johnson MA, Stemmer KL		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-P159
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cincinnati Coll Med Dept Envir Hlth OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1969
		13. NUMBER OF PAGES AND REFS 1P no R
14. PUBLICATION  Fed Proc 1969;28:691 (abstract)		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats (M SD) were exposed to: ZINC Acetate at 0.03, 0.122, 0.488 mM and CADMIUM, both orally in semi purified diet and drinking water (no other data). Zn deficiency in normal rats causes rapid decrease in growth or loss in weight. When deficient rats are given Zn supplement, immediate increase in growth occurs; linear responses to log doses are shown for growth, wbc, Hb, and rectal Temp. Cd given lowered T <sub>rect</sub> and altered normal response to Zn in growth, and blood conc of Zn. There is a competitive antagonism of Cd and Zn. Cd also is localized in liver and kidney, but not in testes.		
17. 18.		
19. KEY WORDS cadmium, zinc, combined effects, growth, toxicity, diet, deficiency syndromes, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0292
4. TITLE (and Subtitle) Studies of Zinc Metabolism in the Rat. 1. Dose Response Effects of Cadmium		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Petering HG, Johnson MA, Stemmer KL		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-159 PHS EC-391
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cincinnati Coll Med Dept Envir Hlth Kettering Lab OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1971
		13. NUMBER OF PAGES AND REFS 29P 18R
14. PUBLICATION Arch Environ Hlth 1971;23:73-101		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory studies, rats (60 M weanling) were exposed to: ZINC acetate, 30.5 uM 74 days, then 122 uM in 78 days, then 488 uM 78 days, in drinking water with semipurified diet; or Zinc Acetate at 30.5 uM for days 28-56 + CADMIUM Chloride at 30.5 uM on days 28-74. Toxic symptoms in Cd (growth reduction and gross pathology) were related to Zn/Cd ratio. Some of Cd toxicity rests in interference with Zn metabolism. Cd changes Zn and Cu in liver and kidney. Zn alters Cu levels in liver and kidney. Cd reverse these effects like an antimetabolite for Zn. Cd loc- alizes in liver and kidney, but not in testes. After Zn deficient diet, rats respond fast and directly in growth to Zn in water. If Cd is given at Zn/Cd 1:1 blood Zn and Cu go up, but no effect if Zn/Cd 4:1. Zn deficiency pathology is enhanced by concurrent Cd. Other findings are reported here.		
17. KEY WORDS zinc, cadmium, combined stresses, metabolism, diet, toxicity, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0228
4. TITLE (and Subtitle) Effectiveness of Selenium and Zinc in Protecting against Cadmium-Induced Injury of the Rat Testis		5. TYPE OF REPORT & PERIOD COVERED Abstract
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Mason KE, Young JO, Brown JE		8. CONTRACT OR GRANT NUMBER(s) G; NIH-GRS
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Rochester Schl Med & Dent NY		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1964
		13. NUMBER OF PAGES AND REFS 1P no R
14. PUBLICATION Anat Rec 1964 (Feb);148:309 (abstract)		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, rats were exposed to: simultaneous doses of ZINC sq, up to 160X that of CADMIUM also administered, with no propective effect against testis injury caused by Cd. But if Zn 30X that of Cd is given in 1 dose 1 day before Cd or distributed 3-6 days before, some protection is provided by the Zn against Cd action (Timing differences relate to low absorption of Zn). SELENIUM compounds at 2X Cd dose given simultaneously with Cd are protective against Cd damage, and are effective if given up to 4 hr before Cd. Se 3X Cd is effective up to 6 days before Cd. When Cd protection is not effective testis damage include infarcts in efferent ductules and proximal segments of the epididymis, bilaterally.		
17. KEY WORDS zinc, cadmium, selenium, combined stresses, protective agents, toxicity, testis pathology, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0187
4. TITLE (and Subtitle) Properties of the Cadmium and Selenium Complex Formed in Rat Plasma in Vivo and in Vitro		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Gasiewicz TA, Smith JC		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Rochester Schl Med & Dent, Envir Hlth Sci Ctr NY		8. CONTRACT OR GRANT NUMBER(s) G: NIH GM-1781 ES-1247 ES-1248
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Chem Biol Interact 1978;23:171-183		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 13P 32R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (M SD) were given MERCURY as $HgCl_2$ or $CH_3HgCl$ labelled with $^{203}Hg$ ; also CADMIUM chloride labelled with $^{109}Cd$ ; also SELENIUM as $Na_2SeO_3$ labelled with $^{75}Se$ , all given simultaneously sq (no other data). The rats were then exsanguinated and studied. There was evidence of Cd-Se complexes in plasma in vivo and in vitro. The stability of these complexes depends on integrity of protein components in plasma. Metabolism may produce $H_2Se$ or similarly reduced selenides. Other data on Hg and its formation of protein complexes and various protective combinations are discussed.		
18.		
19. KEY WORDS cadmium, selenium, mercury, methylmercury, protein complexes, toxicity, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0057
4. TITLE (and Subtitle) Additive Statistical Effects of Cadmium and Lead on Heart-Related Disease in a North Carolina Autopsy Series		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Voors AW, Johnson WD, Shuman MS		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS La State Univ Med Ctr Dept Prev Med New Orleans		8. CONTRACT OR GRANT NUMBER(s) C: EPA CPA-70-105
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Arch Environ Hlth 1982 (2);37:98-102		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 5P 41R
		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In an epidemiological study of associations of heart-related mortality with tissue CADMIUM and LEAD in softwater leached from the soil in 92 sample areas of N Carolina: Cd and Pb levels, and their relation with tissue Cd (eg liver) and Pb (eg aorta) showed sufficient correlation with heart related deaths to allow prediction of cause of death correctly in 80% of deaths sampled. Cd and Pb act additively on the same targets. Mentioned but not analyzed are nutrient protective effects of Ca, Se; Pb in "moon-shine" and Cd in cigarettes, and the specific mechanisms of damage in the CV system. Cd is in the soil available to food and fodder if soil is acidic, and plumbosolvency in Pb containing pipes contributes to the soft water Pb.		
19. KEY WORDS cadmium, lead, combined stresses, epidemiology, heart disease, mortality, water hardness, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0341
4. TITLE (and Subtitle) Cadmium Hypertension		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Schroeder HA, Buckman J		8. CONTRACT OR GRANT NUMBER(s) G: NIH HE-5076 C: DA-2595 C: Ciba
9. PERFORMING ORGANIZATION NAME AND ADDRESS Dartmouth Med Schl Dept Physiol Hanover NH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1967
		13. NUMBER OF PAGES AND REFS 5P 6R
14. PUBLICATION Arch Envir Hlth 1967;14:693-697		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies rats (Long-Evans strain) were exposed to CADMIUM in various treatments: 1. Cd acetate at 5 ug/cc in drinking water daily to 400 days (at which time 11 of 22 showed systolic blood pressures in hypertensive range), 9 were given ZINC disodium Zn CDTA IP 27-36 mg/Kg, and BP measurements made to 21 wk. 2. 10 F 120 day given Cd at 2 mg/Kg IP 1x, then 1 mg/Kg 3 wk later; 10/10 had HBP, then 8 given Disod. Zn CDTA chelator IP 1X, BP measd to 48 hr later, if still HBP 1-2 more doses. 3. 18 older rats given 1 mg/Kg CdAc, repeated 1 wk later. Survivors with HBP given CDTA at wk 3 and killed wk 4. 4. Cd 1.5 mg/Kg IP 1 wk later ZnCDTA IP, studied 1 day later. Hypertension caused by CdAc at 5 ug/Kg 400 days in water or IP 1.5-2 mg/Kg. Treatment with ZnCDTA at 9.1 mg caused hypertension to regress to normal levels without toxic effects. Of 8 given Cd, after ZbCDTA 4 were normal for 2 mo, 4 normal for 5 mo.		
19. KEY WORDS cadmium, zinc, combined stresses, hypertension, chelates, Zn-cyclohexan-diamine-tetraacetic acid, interactive responses, protective effects		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0093
4. TITLE (and Subtitle)  Combined Effect of Carbon Monoxide and and Metallic Mercury Vapors on the Or- ganism of Test Animals (Rus)		5. TYPE OF REPORT & PERIOD COVERED  Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Shulga TM, Bazina AA		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Med Instit, Smolensk USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 5P no R
14. PUBLICATION  Gig sanit (USSR) 1975 (1);59-63		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory experiments rats (M random bred) were exposed to: CARBON MONOXIDE at 18.87 mg/m <sup>3</sup> ; or MERCURY at 0.014 mg/m <sup>3</sup> ; or CO 18.83 mg/m <sup>3</sup> + Hg vapor 0.009 mg/m <sup>3</sup> inhalation exposure for 8 hr/day, 5 days/wk, for 4.5 mo. Measurements were made of co- proporphyrin excretion, oxygen consumption, blood pressure rise, 17 rbc and wbc count, cholinesterase activity, organ weight, adrenal vitamin C content, and neural thresholds. Single substance doses were close to local MPC and had toxic effects. CO + Hg showed additive effects. No other data were available.		
18.		
19. KEY WORDS  carbon monoxide, mercury, combined stresses, toxicity, coproporphyrin, cholinesterase, metabolism, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0038
4. TITLE (and Subtitle) Synergism of Methylmercury and Selenium Producing Enhanced Antibody Formation in Mice		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Koller LD, Isaacson-Kerkvliet N, Exon JH, Brauner JA, Patton NM		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Oreg State Univ Schl Vet Med, Envir Hlth Sci Ctr, Corvallis		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-40 ES-210
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Arch Environ Hlth 1979 (7-8);34:248-251		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 4P 22R
		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory studies mice (384 M) were exposed to: METHYLMERCURY Chloride at 1, 5, or 10 ppm in chow diet; SELENIUM as sodium selenite, 6 ppm in water; given alone or together for 10 wks. MeHg + Se causes significant increase in anti- body synthesis, a response greater than Se alone, and MeHg alone depresses synthesis. Hg conc in kidney is higher when MeHg + Se are given vs MeHg alone. The synergistic increase in antibody producing cells involves primary and secondary immune responses. Effect of such combinations can only established empirically at the present state of the art.		
17. KEY WORDS methylmercury, selenium, combined stress, antibodies, toxicity, immunological status, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0293
4. TITLE (and Subtitle) Effect of Selenite on the Toxicity of Dietary Methylmercury and Mercuric Chloride in the Rat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Potter S, Matrone G		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NC State Univ Dept Biochem, Raleigh		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 10P 15R
14. PUBLICATION J Nutrit 1974;104:638-647		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (72 SD) were exposed to: MERCURY as Methylmercury chloride at 10, 20, 40 ppm in feed; or given as HgCl <sub>2</sub> at 20 or 40-400 ppm in diet; also SELENIUM as sodium selenite at 5 ppm. Treatment was 26 days, first on diet containing Hg (in selected form) alone or with Se (after 17 basal diet for 1 wk) then back to basal to day 74. Se increases Hg retention in liver and spleen, and protects against mortality, increase, growth depression, and neurotoxicity. MeHg is more toxic than equal doses of inorganic Hg. Se metabolism may include formation of dimethyl selenide. 18.		
19. KEY WORDS mercury, selenium, combined stresses, methylmercury, metabolism, toxicity, diet, protective effects, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0319
4. TITLE (and Subtitle) Effect of Cystine, Selenium, and Fish Protein on the Toxicity and Metabolism of Methylmercury in Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Stillings BR, Lagally H, Bauersfeld P Soares J		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS US NOAA Nat Marine Fisheries Svc, College Park Fishery Prods Technol Lab MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 12P 20R
14. PUBLICATION Toxicol Appl Pharmacol 1974;30:243-254		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
<p>16. EXTRACT</p> <p>In laboratory experiments rats (74 M &amp; F weanling) were exposed to: MERCURY as Methylmercury chloride at 25 ppm in diet; L-CYSTINE at 0.4%; or SELENIUM as sodium selenite at 0.6 ppm. Treatments were: MeHg; or MeHg + Se; or MeHg + L-C; some in combinations with 10% fish protein diet; all diets for 10 wks.</p> <p>17. In diets with 25 ppm Hg and 10% protein, cystine reduces toxicity, and Se offers greater reduction. Cystine + Se yield an additive greater effect in increased growth and survival time with MeHg. Toxicity of MeHg is reduced if fish protein replaces casein, and 20% protein is better than 10% in this regard. Inhibition of MeHg</p> <p>18. toxicity is not related to elimination (actually more Hg may be retained). An artefact to be avoided in such studies is that commercial cystine contains up to 2% Se.</p>		
<p>19. KEY WORDS</p> <p>mercury, selenium, l-cystine, fish protein, combined stresses, diet, toxicity, methylmercury, metabolism, interactive responses</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0120
4. TITLE (and Subtitle) Interactions between Selenium Compounds and those of Mercury or Cadmium		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Parizek J		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS CZECHOSLOVAKIA: Acad Sci Physiol Instit Prague		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 3P 15R
14. PUBLICATION Environ Hlth Perspect 1978 (Aug);25:53-55		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT  In a brief survey of trace element interaction these topics are discussed: direct chemical reactions between these elements and their compounds eg in vitro; metabolic changes induced by prior dose of SELENIUM, modifying dose-effect forms for other elements by interaction at physiological levels, eg at Se intake 17 locales; specific protective effects of Se injections in animals exposed to lethal inhalation doses of Cd; Se protection against organic and inorganic forms of Hg; and other related topics.  18.		
19. KEY WORDS  selenium, mercury, cadmium, combined stresses, metabolism, toxicity, protective effects, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0278
4. TITLE (and Subtitle) Diversion of Mercury Binding in Rat Tissues by Selenium: a Possible Mechanism of Protection		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Chen RW, Whanger PD, Fang SC		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-529 ES-7413
9. PERFORMING ORGANIZATION NAME AND ADDRESS Oreg State Univ Dept Agric Chem, Corvallis		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 9P 15R
14. PUBLICATION Pharmacol Res Commun 1974;6:571-579		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments rats (M Long-Evans) were exposed to: SELENIUM as sodium selenate 0.01 mmol/Kg sc; also MERCURY as $^{203}\text{HgCl}_2$ (104 uCi) at 0.01 mmol/Kg. In the treatments, all were given sc: Hg alone, or Se 30 min before Hg. Animals were prepared for analyses 1 hr later. Se decreases Hg toxicity, associated with a redistribution of Hg, which is increased in blood and testes and reduced in kidney. This Se driven diversion to less critical tissue components also occurs with Cd. Also here, the Hg in the "soluble fraction" (a major subcell Hg binding component) is diverted from low mol wt proteins to large mol wt proteins as in liver, testes, kidney.		
17. KEY WORDS mercury, selenium, combined stresses, toxicity, tissue dose, pathology, interactive response		
18. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0088
4. TITLE (and Subtitle) Combined Toxic Effects of Lead, Selenium, and Cobalt under Industrial Conditions (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Lyubchenko PN, Dupliankin SA, Dmitrieva LG, Avramenko MM, Savitskaya EA, Zhdanko TF		8. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS (Moscow) Regional Clin Res Instit at Vladimirskogo, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 3P 14R
14. PUBLICATION  Gig trud (USSR) 1982 (1);26-28		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In occupational observation and clinical study, workers with ceramic dyes (90, 86 M, 4 F, ages 25-50 yr) were exposed to: LEAD at 0.17-0.66 mg/m <sup>3</sup> , SELENIUM at 0.05-2.4 mg/m <sup>3</sup> , and COBALT at 0.4-0.6 mg/m <sup>3</sup> , each in aerosol form. One group (41) were exposed to Pb alone, a second group (49) encountered Pb + Se + Co. 17 Studies were made of rbc count, urine coproporphyrin, and del-aminolevulinic acid. In the combined exposure group, the toxic effects of Pb were more pronounced, with lower Hb, increased count of basophilic granular rbc, and increased excretion of ALA and CP.. Under industrial conditions, Se in the concentrations 18. given here, cannot protect from Pb toxicity.		
19. KEY WORDS lead, selenium, cobalt, combined stresses, ceramic dye industry, del-aminolevulinic acid, coproporphyrin, toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0294
4. TITLE (and Subtitle) Selenium and Lead: Mutual Detoxifying Effects		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Rastogi SC, Clausen J, Srivastava KC		8. CONTRACT OR GRANT NUMBER(s) G: DANIDA 104-P3-Ind-408
9. PERFORMING ORGANIZATION NAME AND ADDRESS DENMARK: Univ Odense Instit Hyg		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 12P 34R
14. PUBLICATION Toxicol 1976;6:377-388		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT <p>In laboratory studies rats were exposed to LEAD as Lead naphthenate, (used in lube oils and greases) 80-200 mg Pb/Kg in 5% ether, dripped onto skin, for 8 wks; and SELENIUM as Sodium selenite, at 5, 10, 15 ppm Se in drinking water (above the known 3 ppm Se in water chronic toxicity threshold). The two disparate routes of administration were selected to avoid interaction before body uptake. Se or Pb alone reduced growth rate and feeding. With Se + Pb growth rate and food consumption approached normal, as were del-aminolevulinic acid (ALA) in blood, liver, and kidney, also liver cytochrome P-450. ALA or P-450 were depressed with Se or Pb alone. The antagonism of toxic effects by Se with Pb bears little relation to findings of high levels of the metals in the organs. Pb may also form complexes with Se, like PbSeO<sub>3</sub>, and Se enters brains in combined form, and may offset possible damage to blood brain barrier by Pb.</p>		
19. KEY WORDS <p>selenium, lead, combined stresses, diet, lubricating oils, lead naphthenate, del-aminolevulinic acid, interactive responses</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0122
4. TITLE (and Subtitle) The Relationship of Cadmium and Zinc in Experimental Mammalian Teratogenesis		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Ferm VH, Carpenter SJ		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Dartmouth Med Schl Dept Anat Hanover NH		8. CONTRACT OR GRANT NUMBER(s) G: NIH HD-2616 GM-10210
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Lab Invest 1968 (Apr);18:429-432		12. REPORT DATE 1968
		13. NUMBER OF PAGES AND REFS 4P 19R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, hamsters (pregnant, on day 8, where major organ systems are established in a 24 hr period) were exposed to: CADMIUM Sulfate at 2 mg/Kg IV; or ZINC sulfate at 2 mg/Kg IV, separately or in combination. Cd induced facial abnormalities. Simultaneous administration of Zn prevented Cd teratogenicity. Cd given 12 hr after Zn failed to protect. Cd may induce inhibition of sulfhydryl enzymes and succinoxidase.		
17. 18.		
19. KEY WORDS cadmium, zinc, combined stresses, teratogenesis, toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0166
4. TITLE (and Subtitle) Arsenic Exposure and Mortality: A Case-Referent Study from a Swedish Copper Smelter		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Axelson O, Dahlgren E, Jansson CD, Rehnlund SO		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS SWEDEN: Orebro Regnl Hosp Dept Occ Med		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 8P 21R
14. PUBLICATION  Brit J Indust Med 1978;35:8-15		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT This case-control epidemiological study of workers in copper smelting, done with aid of Boliden Metall Skelleftehamn, used data from local registries on 369 deaths, av ages 60-76 yr. Special attention was paid to exposure to ARSENIC (trivalent), COPPER, and SULFUR DIOXIDE. Exposure estimates began with 1928 17 hygienic standards, and established 3 levels relative to 0.5 mg/m <sup>3</sup> below, close, and over this level. Also taken into account was the exposure period, and its relation to latency periods for responses to emerge. Analyses considered 325 subjects, 74 controls (who died from unrelated causes), yielding 251 cases (with 18. 10 diagnoses in 2 categories/subject). Selected cases dealt with lung tumors and bronchial cancer (lung cancer mortality was up 5X over controls, and is As dose-response related); CV disease (up 2X); leukemia, myeloma and other malignancies (increased).		
19. KEY WORDS arsenic, copper, combined stresses, toxicity, copper smelting, case-control studies, epidemiology, lung disease, cardiovascular disease, interactive responses.		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0167
4. TITLE (and Subtitle) Arsenic and Selenium in Lung, Liver, and Kidney Tissue from Dead Smelter Workers		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Wester PO, Brune D, Nordberg G		8. CONTRACT OR GRANT NUMBER(s) G: Work-Hlth fund
9. PERFORMING ORGANIZATION NAME AND ADDRESS SWEDEN: Umea Univ Depts Med, Hyg NORWAY: Scand Inst Dent Material, Oslo		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 6P 27R
14. PUBLICATION  Brit J Indust Med 1981 (2);38:179-184		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT Observations were made on deceased workers (40 M av 66.6 yr) at smelter in Ronnskarsverken in N. Sweden. ARSENIC and SELENIUM in lung, liver, and kidney were determined using neutron activation. There was a 7x level of As in lungs of workers compared with unexposed controls; and this As level in lung cancer was about the same in other malignancies or cardiovascular diseases of these men. In 6 who died of lung cancer there were the highest concentrations of the metals, as well as accumulations of Sb, Ln, Pb, and Cd. 15/40 died from various malignancies, 17 from CV disease, 5 from cerebrovascular events. Exposure periods av 31 yr. Arsenic in kidney cortex was 5 ppb, in lung av 50 ppb, with wide variability found in normal tissues (unexposed controls). In this epidemiological study, multifactorial causes for excess mortality among smelters are examined with consideration of smoking, toxic gases, and other metals exposures.		
17. KEY WORDS arsenic, selenium, combined stresses, smelting industry, toxicity, lung pathology, kidney diseases, epidemiology		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0340
4. TITLE (and Subtitle) Arsenic and Cancer: Effects of Joint Administration of Arsenite and Selenite on the Genesis of Mammary Adenocarcinoma in Inbred Female C3H/St Mice		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Schrauzer GN, White DA, McGinness JE, Schneider CJ, Bell LJ		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cal, Revelle Coll, Dept Chem, La Jolla CA		8. CONTRACT OR GRANT NUMBER(s) G: Nat Fisheries Inst DC G: Se-Tl Devel Assn G: U Cal Ca Res Coord Ctee
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  Bioinorgan Chem 1978;9:245-253		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 9P 20R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, mice (F, inbred C3H/S+) were exposed to: ARSENIC as Sodium Arsenite at 2 ppm; or SELENIUM as Sodium Selenite at 2ppm, each or both together in drinking water (protective effects of As may not be seen if given with feed instead of water). In these cancer susceptible mice, As abolishes any anti-carcinogenic effect of Se; there is a joint increase in spontaneous mammary adenocarcinoma over each alone. As alone increases tumor growth in rats also incidence of multiple tumors. Se stimulates certain immune responses, has antimutagenic effects. It is speculated that As + Se inactivate each other by direct chemical combination in the cell.		
19. KEY WORDS arsenic, selenium, combined stresses, cocarcinogenesis, toxicity, adenocarcinoma, interactive responses, protective effects		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0201
4. TITLE (and Subtitle) Synergistic Teratogenic Effects of Arsenic and Hyperthermia in Hamsters		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Ferm VH, Kilham L		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-697 HD-7775 CI-RCDA
9. PERFORMING ORGANIZATION NAME AND ADDRESS Dartmouth Med Schl Dept Anat, Hanover NH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1977
		13. NUMBER OF PAGES AND REFS 4P 8R
14. PUBLICATION Envir Res 1977 (Dec);14:483-486		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, hamsters (pregnant, on day 8, where major organ systems are established in a 24 hr period) were exposed to: HEAT at 40° C for 50, 55, 60 min to induce hyperthermia; or ARSENIC as Sodium Arsenate 10 mg/Kg (a dose at the malformation threshold) then heat at 1, 2, 3 hrs after IP injection; or Sodium Arsenate at 10 mg/Kg IP then kept in dark cabinet. As + heat are synergistic. Combinations of minimal teratogenic levels of each cause marked rises in frequency and severity of developmental malformations and in fetal resorptions. Hyperthermia of 3 or 4° C rise can induce encephalopathy in fetuses of hamsters, rats, guinea pigs. The synergy may exist because heat accelerates chemical reactions, or changes permeability of the placenta or from intrinsic mitotic sensitivity to both agents, or from all 3 mechanisms.		
17. KEY WORDS arsenic, hyperthermia, combined stresses, teratogenesis, toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0190
4. TITLE (and Subtitle) Interrelationships of Selenium, Cadmium, and Arsenic in Mammalian Teratogenesis		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Holmberg RE, Ferm VH		8. CONTRACT OR GRANT NUMBER(s) G: NIH HD-2616 G; NIH GM-10210
9. PERFORMING ORGANIZATION NAME AND ADDRESS Dartmouth Med Schl Dept Anat, Hanover NH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1969
		13. NUMBER OF PAGES AND REFS 5P 20R
14. PUBLICATION  AMA Arch Environ Hlth 1969;18:873-877		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, hamsters (on day 8, where major organ systems are established in a 24 hr period, pregnant females) were exposed to: CADMIUM sulfate at 2 mg/Kg IV; or ARSENIC as Sodium Arsenate at 20 mg/Kg; or SELENIUM as Sodium Selenite at 2 mg/Kg. Cd is teratogenic, at the sublethal dose given 50% will be mal- 17 formed. As is teratogenic, at the dose above there are major malformations. Se is not itself teratogenic, but does protect against malformations of Cd and As if Se is given at same time as either. This protection is still marked up to 30 min, then drops rapidly at 2 and 4 hr. The Se can cross the placenta, alter 18 metabolism, and may form protective complexes, in its antagonistic effects.		
19. KEY WORDS selenium, arsenic, cadmium, combined stresses, toxicity, fetal metabolism, teratogenesis, interactive responses		
20. NOTES		





REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0246
4. TITLE (and Subtitle) General Subcellular Effects of Lead, Mercury, Cadmium, and Arsenic		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Fowler BA		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIEHS Lab Envir Toxicol, Res Tri Pk NC		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 5P 41R
14. PUBLICATION Environ Hlth Perspect 1978 (2);22:37-41		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT Each element alone interferes with normal cell replication, genetic processes, and metabolic events. LEAD has a broad spectrum of actions: intranuclear inclusions, abnormal mitoses, polyploidy, chromosome gaps; also mitochondrial swelling, changes in respiration, specific inhibitions eg of lipoic acid dehydrogenase,; also endoplasmic reticulum changes, microsome enzyme activations, protein synthesis. MERCURY also causes changes in nuclei, DNA, RNA, protein synthesis, mitochondria, lysosomes, endoplasmic reticulum. CADMIUM generally affects all subcell parts. ARSENIC toxicity evaluation must consider the chemical form and oxidation state; the trivalent has the worst action, though the pentavalent form is more common.		
19. KEY WORDS lead, mercury, cadmium, arsenic, combined stresses, toxicity, heme synthesis, nuclear inclusions, mitochondria, microsomes, endoplasmic reticulum, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0117
4. TITLE (and Subtitle) Some observations on the Interaction of Zinc, Copper, and Iron Metabolism in Lead and Cadmium Toxicity		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Petering HG		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-159
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cincinnati Med Ctr Dept Envir Hlth, Kettering Lab		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 4P 26R
14. PUBLICATION  Environ Hlth Perspect 1978 (Aug);25:141-145		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT  This surveys the effects in rats and on L cells in vitro after po administration of LEAD and CADMIUM, in normal and deficient diets, with observations on metabolism of Zinc, Copper, and Iron. Nutritional deficiencies can increase absorption and toxicity of oral Pb and Cd; and the latter can perturb metabolism of Zn, Cu, and Fe (providing some earliest signs of toxicity from Cd or Pb. Nutritional status must be considered in metals toxicity (also among industrial workers), and nutritional improvement offers a preventive role especially in trace metal intakes. Pb and Zn interact to alter del-aminolevulinic acid; Zn has a protective action on Pb absorption and biological effects. There are Pb-Fe interactions; low Cu enhances Pb absorption; Cd acts on Zn metabolism, absorbed Cd affects Cu and Fe metabolism, and none acts independently here.		
19. KEY WORDS  lead, zinc, copper, iron, cadmium, combined stresses, toxicity, diet, metabolism, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0266
4. TITLE (and Subtitle) Investigations of Factors Influencing Exposure and Response to Lead, Mercury, and Cadmium in Man and Animals		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Roels HA, Buchet JP, Bernard A, Hubermont G, Lauwerys RR, Masson P		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS BELGIUM: Univ Louvain, Indust & Med Toxicol Unit Brussels		8. CONTRACT OR GRANT NUMBER(s) G: Min.Publ Hlth G: Internat Pb-Zn Res Orgzn.
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Environ Hlth Perspect 1978 (8);25:91-96		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 6P 14R
		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT Observations were made on 500 Belgium women during pregnancy for exposure to LEAD, MERCURY, CADMIUM, AND CARBON MONOXIDE. Mean levels were: Pb 3.1-31 ug%, Hg 0.01-4.6ug%, Cd 0.01-1.0 ug%, and COHb 0.12=4.84 %. Factors of smoking, residence site, age, occupation, drinking were considered. No other data were given.		
17. A variety of other problems are discussed. In humans and rats, heme biosynthesis pathway is susceptible to Pb alteration, shown by increased Free Erythrocyte Porphyrin (FEP) concentration. This response is greatest in the young, less in adult females, least in adult males. Cd proteinuria seen in workers involves changes in		
18. tubules and glomeruli. There is no synergy of Cd and Pb in this proteinuria or these kidney changes. Hg (if methylmercury) goes from mother to fetus easily, Pb less easily, Cd least easily. F sex hormone interact with FEP response in adult rats. There is discussion on protein clearance in exposures to these metals.		
19. KEY WORDS lead, mercury, cadmium, carbon monoxide, free erythrocyte porphyrin, pregnancy, heme biosynthesis, proteinuria, protein clearance, combined stresses, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0283
4. TITLE (and Subtitle) Interactions of Cadmium with Copper, Iron, Zinc, and Manganese in Ovine Tissues		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Doyle JJ, Pfander WH		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Missouri Anim Sci Res Ctr, Columbia		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 8P 44R
14. PUBLICATION  J Nutrit 1975;105:599-606		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT Experiments are described using lambs (30 M age 4 mo) exposed to: CADMIUM at 0, 5, 15, 30, 60 ppm fed in standard diet for 191 days. Tissue Cu, Zn, Fe, and Mn was measured. Cd in all tissues goes up with diet Cd; Fe in ileum goes down; liver Cu, Fe, Mn go down, and Zn rises in liver; spleen and testes Cu drops, whereas kidney 17 Cu and Zn rise. There are specific interactions among Cd, Cu, Fe, Zn, Mn, some perhaps by direct effect of Cd on absorption, storage, excretion. Cd displaces Zn from muscle and bone. Low conc of Cd in diet alters Cu metabolism. 18.		
19. KEY WORDS cadmium, interactive responses, copper, manganese, iron, zinc, metabolism, diet, nutrition, toxicity, organ metal content		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0356
4. TITLE (and Subtitle) Heavy Metal Pollution Among Auto Workers. 2. Cadmium, Chromium, Copper, Manganese, and Nickel		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Clausen J, Rastogi SC		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS DENMARK: Odense Univ Instit Hyg		8. CONTRACT OR GRANT NUMBER(s) G: Dan Internat Dev Agcy G: Cmsn Euro Communities 075-74-ENV.DK
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Brit J Indust Med 1977 (3);34:216-220		12. REPORT DATE 1977
		13. NUMBER OF PAGES AND REFS 5P 29R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT Limited information is provided in measurements made on workers in auto garages and repair shops, exposed in various processes to Cd, Cu, Cr, Mn, Ni, Zn, Fe, Pb, Ti, V, and others from welding fumes, paints, and organometallics in lubricants (eg Mn tricarbonyl). The report deals only with metals in the 17 actual combined exposure environment. Measurements of these substances in the workers, along with analyses for del-aminolevulinic acid, carboxyhemoglobin and other factors, are discussed for various combinations of exposure. Comparisons of findings with calculations of approach to TLV limits, using additive 18. interaction equations, are considered.		
19. KEY WORDS metals, combined stressors, auto repair, del-aminolevulinic acid, carboxyhemoglobin, or organometallics, lubricating oils, welding fumes, toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0264
4. TITLE (and Subtitle) Factors Influencing Effects and Dose Response Relationships of Metals		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Nordberg GF, Parizek J, Piscator M		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS SWEDEN: Umea Univ		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 16P 85R
14. PUBLICATION pp 142-157 in "Handbook on Toxicology of Metals" Friberg L et al, eds Elsevier N Holland 1979		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT This discusses interactions of a number of toxic metals, as may occur in vivo and in vitro. Modes of encounter are described, including non-interactive events, interactions of additive or synergistic or antagonistic classes. Comparisons of various animal tests, relation of metals and nutrition, influence of therapeutic drugs on metals metabolism and toxicity are considered. The relation of other chemicals to metal toxicity, changes in toxic reactions with organism age, from fetus and neonate on, and interactions with physical environmental factors are also discussed.		
17		
18.		
19. KEY WORDS metal-metal interactions, combined stresses, arsenic, selenium, cadmium, lead, mercury, copper, thallium, nutrition, drugs, interactive response		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0063
4. TITLE (and Subtitle)  Interactions of Toxic Elements with Essential Elements: Introduction		5. TYPE OF REPORT & PERIOD COVERED  Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Sandstead HH		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Dept Agric Hum Nutrit Res Ctr Grand Forks ND		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES/REFS 3P 16R
14. PUBLICATION  Ann NY Acad Sci 1980;355:282-284		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. ABSTRACT In a brief survey as part of a symposium on this subject, a diagram shows a large variety of possible metal-metal interactions, some competing for ligands, eg Cu, Cd, Zn to metallothioneins. Also discussed are absorption-facilitating complexes such as picolinic acid and Zn metabolites. Brief reference to metals discussed here and in the symposium include Mn, Co, Pb, Fe, Ni, Cr, V, F, Zn, Cu, Mo, W, As, Si, Cd, Hg, Mg, Se, and Rb. Information sources are cited on Cd, Pb, and Hg interactions with essential elements		
19. KEY WORDS  toxic elements, essential elements, combined stresses, metabolism chemical complexes, interactive responses		
20. NOTES		



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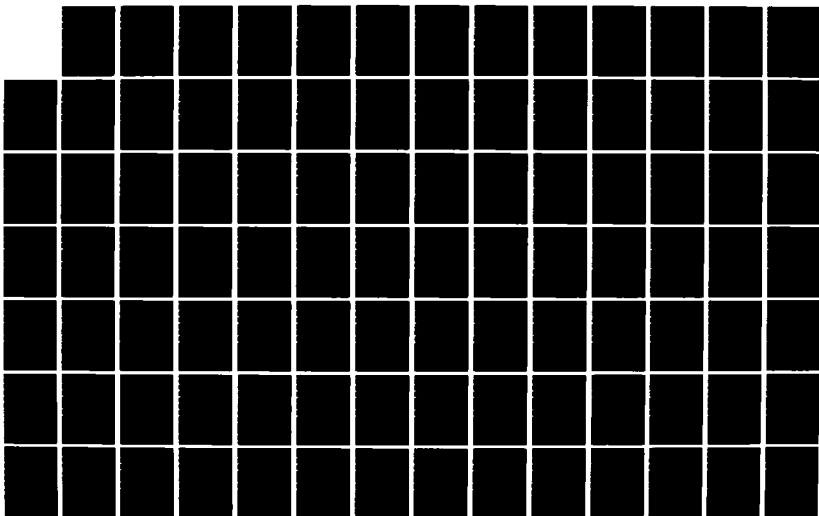
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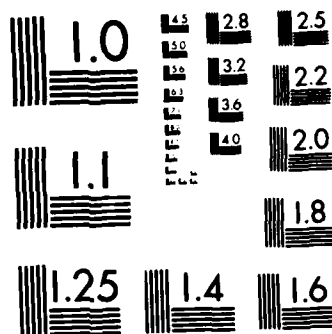
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0254
4. TITLE (and Subtitle) Theoretical and Practical Considerations on the Problem of Metal-Metal Interaction		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Magos L, Webb M		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS ENGLAND: MRC Molec Toxicol Sect, Surrey		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 4P 41R
14. PUBLICATION Environ Hlth Perspect 1978 (8); 25:151-154		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT This short survey paper discusses reaction between two metals chiefly in vitro: their competition for carriers, metabolic interferences, the induction of protein binding sites, various morphologic factors, and interactive synergistic and antagonistic effects, as applicable to combined stressor studies in vivo		
17.		
18.		
19. KEY WORDS metal-metal interactions, protein binding, carriers, metabolism, in vitro reactions, combined stresses, synergy		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0354
4. TITLE (and Subtitle) In Vivo Interactions of Cadmium, Copper, Zinc, and Iron in the Mouse and Rat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Bunn CR, Matrone G		6. PERFORMING ORG. REPORT NUMBER Pap 2231 Jnl ser AgExSt
9. PERFORMING ORGANIZATION NAME AND ADDRESS N Carolina State Univ Dept Biochem Raleigh NC		8. CONTRACT OR GRANT NUMBER(s) G:NIH-A-5651 G:Herman Frasch Fdtn
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION J Nutrit 1966;90:395-399		12. REPORT DATE 1966
		13. NUMBER OF PAGES AND REFS 5P 15R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies, rats and mice were pretreated for 2 wks either with a copper deficient diet (to deplete COPPER) or a normal diet. All were then given diets containing IRON 100 ppm, COPPER 2 ppm, ZINC 9 ppm, and CADMIUM 0 or 100 ppm in various mixes. Cd reduced wt gain and Hb, and lowered liver Fe. Pretreatment conditioned a GI tract modification related to dietary cations. When the tract is condition to normal trace levels of cations, it is able to absorb more Cd. Supplemental Cu and Zn overcame adverse effects of Cd in Cu deficient diet, but not in normal diet.		
17. KEY WORDS copper, cadmium, combined stresses, zinc, iron, diet, intestinal absorption, trace metal metabolism, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER 40044
4. TITLE (and Subtitle) Concurrent Exposure to Lead, Cadmium, and Arsenic. Effects on Toxicity and Tissue Concentrations in the Rat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Mahaffey KR, Capar SG, Gladen BC, Fowler BA		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS FDA Bur Foods Div Nutr Wash DC (KM);		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION J Lab Clin Med 1981 (Oct);98:463-481		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 19P 43R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies, rats (120 M on casein enriched diets) were exposed to: CADMIUM chloride at 50 ppm, LEAD acetate at 200 ppm, and ARSENIC as Sodium arsenate at 50 ppm, added to diet as single or combinations of pairs or triad, for 10 wks. Cd made no change in uric acid or kidney wt or urinary porphyrins, but reduced alk- 17. aline phosphatase, Hb and Hematocrit, Fe in liver, kidney, and femur, and Zn in femur and increased rbc. Pb made no change in wt gain or feeding or alkaline phosphatase, raised uric acid, kidney wt (+ nuclear inclusions and mitochondrial swelling), raised U-ALA. As dropped SGOT, alk phosphatase, Hb, Ht, no change in kidney wt but 18. swells tubule mitochondria. Cd + As drops wt gain more than each alone, Cd + Pb reduces Pb levels and tissue burden in bone and kidney and kidney nuclear inclusions. Pb + As raises further coproporphyrin levels, not uroporphyrin or ALA. Pb + Cd + As causes higher rise in rbc than each separately.		
19. KEY WORDS cadmium, lead, arsenic, combined stresses, diet, toxicity, heme synthesis, organ pathology, kidney intranuclear inclusions, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0369
4. TITLE (and Subtitle) Effects of Concurrent Administration of Dietary Lead, Cadmium, and Arsenic in the Rat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Mahaffey KR, Fowler BA		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FDA Bur Foods Div Nutr Wash DC (KM); NIEHS Res Tri Pk NC (BF)		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1977
		13. NUMBER OF PAGES AND REFS 7P 26R
14. PUBLICATION  Environ Hlth Perspect 1977 (8);19:165-171		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory studies, rats (168 M adult SD) were exposed to: CADMIUM, at 50 ppm, ARSENIC as Sodium Arsenate 50 ppm, or Lead at 200 ppm; with each alone, or pairs, or all three given together in normal diet. Lead showed no effect on weight gain or feeding, but increased U aminolevulinic acid (ALA) and raised uric acid. As reduces SGOT, with no change in uric acid. Pb + Cd reduce hemoglobin and hematocrit, and Cd reduces Pb effects on kidney, Cd also offsets some Pb driven gain in U-ALA. Cd + As reduce wt gain more than either alone, and drop Hb and Ht. Pb + Cd + As increases rbc, to higher levels than the sum of the separate metals. The presence of other metals reduces the Pb effects.		
17. KEY WORDS lead, arsenic, cadmium, combined stresses, toxicity, diet, nutrition, metabolic conversion, aminolevulinic acid, uric acid, nephrotoxicity, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0110
4. TITLE (and Subtitle)  Interactions among Lead, Cadmium, and Arsenic in Relation to Porphyrin Excretion Patterns		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Fowler BA, Mahaffey KR		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIEHS, Lab Envir Toxic, Res Tri Pk NC(BF) FDA, Bur Foods, Wash DC (KM)		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 4P 23R
14. PUBLICATION  Environ Hlth Perspect 1978;25:87-90		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory experiments, rats (168 M SD) were exposed to: LEAD Acetate at 200 ppm. CADMIUM Chloride at 50 ppm, and ARSENIC as Na Arsenate at 50 ppm; all added to usual diet for 10 wks. Measurements were made of urinary aminolevulinic acid (ALAO, uroporphyrin (UP) and coproporphyrin (CP); carbohydrate metabolism, and urea cycle. Pb alone caused increase in U-ALA and coproporphyrin, alters heme synthesis and pyruvate respiration; Cd alone had no effect on most processes, but inhibited oxidative phosphorylation, As alone increased U-coproporphyrin and uroporphyrin, inhibited pyruvic respiration. Cd + Pb and As + Pb have an additive effect on mitochondrial toxicity, biochemical systems and porphyrin excretion. As + Pb have additive effect on coproporphyrin but not on ALA or uroporphyrin. Pb + Cd + As will show either additive or antagonistic effect, depending on conditions selected.		
19. KEY WORDS  lead, cadmium, arsenic, combined stresses, diet, metabolism, aminolevulinic acid, coproporphyrin, uroporphyrin, mitochondria, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0084
4. TITLE (and Subtitle) Combined Effect of Mercury and Chlorine on the Organism of Workers (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Krasniuk EP, Pines AG, Parliuk AF, Med- vedovskaya CP, Zaritskaya LA, Loganovsky NG, Onikyenko FA, Lukhtai VA et al		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Industr Hyg Inst, Kiev, USSR		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 5P 13R
14. PUBLICATION Vrach delo (USSR) 1980 (1);130-134		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT Occupational observations and clinical studies on workers in electrolytic production of chlorine are reported briefly. The workers (312 "exposed", 80% M, under 50 yr) were exposed to: CHLORINE, over 1 mg/m <sup>3</sup> (their MPC); and MERCURY VAPOR, over their MPC (not given) for period from 1 to over 10 yr. 17 They were screened regularly. When compared with unexposed con- trols (278) there was an increased frequency of CNS and periph- eral neural disorders, altered bioelectric activity of brain; myocardial dystrophy (chiefly Hg driven); systemic hypertension; chronic bronchitis and subatrophic rhinopharyngitis, chiefly 18. Chlorine driven, gastritis, conjunctivitis, cholecystitis and altered liver function.		
19. KEY WORDS mercury, chlorine, combined streses, chemical industry, pathology, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE	
1. REPORT NUMBER	2. GOVT ACCESSION NO. 3. CATALOG NUMBER A0263
4. TITLE (and Subtitle) Factors Influencing Metabolism and Toxicity of Metals: A Consensus Report by the Task Group on Metal Interaction	5. TYPE OF REPORT & PERIOD COVERED Jnl review
7. AUTHOR(s) Nordberg GF Ed	6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS SWEDEN: Karolinska Instit Stockholm	8. CONTRACT OR GRANT NUMBER(s) Swed. Wk.Envir.Fund
11. CONTROLLING OFFICE NAME AND ADDRESS	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Environ Hlth Perspect 1978 (8);25:3-41	12. REPORT DATE 1978
	13. NUMBER OF PAGES AND REFS 39P 312R
	15. SECURITY CLASS. (of this report)
	16. DISTRIBUTION
16. EXTRACT This report reviews the work of a group organized by the Scientific Committee on Toxicity of Metals, part of the Permanent Commission and International Association on Environmental Health. A list of editorial committee members is provided. Topics include: Work and other Environment Factors (sources of metal 17. toxics, their transformations, affinities, sinks, physical-chemical interactions); Toxicology of Metals (independent or joint 18. action in organism, sites, modes, synergies, examples of interactions; then systematic detail of toxicities and interactions among Arsenic, Selenium, Lead, Cadmium, Zinc, Iron, Calcium, Mercury; and discussion of other modulators: age, sex, nutritional status, smoking, other atmospheric pollutants, etc.	
19. KEY WORDS Toxic metals, sources of pollutants, metal-metal interactions, toxicology, arsenic, lead, cadmium, zinc, iron, calcium, mercury, selenium, environmental health, interactive responses	
20. NOTES	

SOLVENTS  
COMBINED STRESS EXTRACTS

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0238
4. TITLE (and Subtitle) Biotransformation of Organic Solvents		5. TYPE OF REPORT & PERIOD COVERED Review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Toftgard R, Gustafsson A		8. CONTRACT OR GRANT NUMBER(s) G: Work Environ Fund
9. PERFORMING ORGANIZATION NAME AND ADDRESS SWEDEN: Karolinska Instit Dept Chem, Stockholm		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 18P 109R
14. PUBLICATION Scand J Work Environ Health 1980;6:1-18		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT Topics discussed include: Specific processes of oxidation (microsome CP450 catalyzed); hydroxylation, deamination, dealkylation; reduction; conjugation (eg ATP driven glucuronic acid coupling), methylation, acetylation, etc. 17. Roles of biotransformation, in making water-solubles, in metabolic activation (forming reactive intermediates, some more toxic than originals), induction of metabolizing enzymes. Examples of some specific xsfmts among aromatics (benzene, styrene, toluene, xylene), halogenated hydrocarbons (chlorinated alkanes, ethylenes like TCE) other alkanes, alcohols, etc. 18. Metabolites as Tests for Exposure: phenol for benzene, mandelic acid for styrene, hippuric acid for toluene. Interactions between solvents, drugs, ethanol.		
19. KEY WORDS solvents, combined stresses, biotransformations, oxidation, reduction, hydroxylation, conjugation, reactive intermediates, bioindicators of exposure, interactive mechanisms		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0017
4. TITLE (and Subtitle)  Influence of Phenobarbital on Xylene Metabolism in Man and Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) David A, Flek J, Frantik E, Gut I Sedivec V		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS CZECHOSLOVAKIA: Indust Hyg & Occup Dis Ctr Prague		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 8P 14R
14. PUBLICATION  Int Arch Occup Environ Health 1979;44:117-125		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT <p>In laboratory experiments human subjects and rats were pretreated with PHENOBARBITAL, then exposed to M-XYLENE (no data available). The enzyme inductions in both species in liver do not lead to enhanced metabolism of the absorbed M-X (eg at 400 mg/m<sup>3</sup> inhaled) at lower levels; at these conc the normal biotransformations in liver are enough to metabolize total absorption pool. At higher conc of M-X (eg 2000-4000 mg/m<sup>3</sup>) the normal mechanism is saturated, and PB potentiates the enhanced secretion of more M-methylbenzoic acid metabolite). It becomes fallacious to calculate absorbed doses of such organic solvents from excreted metabolites unless the exposures to PB and such drugs are also known.</p>		
19. KEY WORDS <p>phenobarbital, xylene, combined stresses, solvents, toxicity, metabolism, liver enzyme induction, interactive responses</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0013
4. TITLE (and Subtitle) Worker Exposures to Chemical Agents in the Manufacture of Rubber Tires: Solvent Vapor Studies		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Van Ert MD, Arp EW, Harris RL, Symons MJ, Williams TM		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ NC Schl Pub Hlth, Occup Hlth Studies Group, Chapel Hill		8. CONTRACT OR GRANT NUMBER(s) Sponsors: industry & union consortium
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  Am Ind Hyg Assoc J 1980 (Mar);41:212-219		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 7P 9R
		15. SECURITY CLASS. (of this report)
16. EXTRACT  In occupational studies on rubber workers in 10 tire plants, exposure to solvents such as BENZENE, TOLUENE, various ALKANES were assessed by first examining job classes, processes, functions, and products; then classifying exposures as high, middle, or low (relative to TLV). Approx 5000 air samples were taken and assayed, and at a selected 200 points at the breathing zones of workers. Mixed vapor conc in several samples exceeded the threshold limits (calculated by additive means) for mixed solvents. All of this was used as a basis for other studies of worker responses.		
19. KEY WORDS solvents, combined stresses, rubber and tire industry, toxicity, toluene, benzene, alkanes, air sampling, interactive events.		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0269
4. TITLE (and Subtitle)  Some Aspects of the Mechanisms by which Industrial Solvents Produce Neurotoxic Effects		5. TYPE OF REPORT & PERIOD COVERED Review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Savolainen H		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  FINLAND: Instit Occ Hlth Helsinki		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1977
		13. NUMBER OF PAGES AND REFS 11P 72R
14. PUBLICATION  Chem Biol Interact 1977 (1);18:1-10		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT  The pharmacology of a wide variety of substances, and highlights on some of their interactions, are discussed. Acute events, such as formation of short-lived intermediates (TCE to asymmetric and symmetric epoxides, benzene to aryl epoxide, C <sub>2</sub> S to epoxides and semioxide), and more long-lived intermediates (eg CH <sub>2</sub> Cl <sub>2</sub> to CO, dichloromethane to CO, styrene to epoxide) are considered in terms of their role in toxicity. Other acute actions, on nerve cell membranes and energy metabolism (eg C <sub>2</sub> S + TCE changes in mitochondrial energy production) are discussed. Certain chronic events in neural metabolism, protein synthesis, enzyme alterations, and some related neuropathies are considered. The clinical consequences and recovery from exposures, including the possibilities of certain reversals (eg early neurotoxicity due to n-hexane) are discussed.		
17. KEY WORDS  solvents, combined stresses, toxicity, industrial exposure, pharmacology, carbon disulfide, trichloroethylene, benzene, n-hexane, chlorinated hydrocarbons, reactive intermediates, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0113
4. TITLE (and Subtitle) Effect of Phenobarbitone and Starvation on Hepatotoxicity in Rats Exposed to Carbon Disulfide Vapor		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Magos L, Butler WH		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS ENGLAND: MRC Toxicol Unit, Surrey		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 3P 8R
14. PUBLICATION Brit J Indust Med 1972;29:95-98		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory studies rate (M albino) were exposed to: PHENOBARBITAL Sodium at 50, 50 mg/Kg IP, 24 hr before CARBON DISULFIDE at 2.0 mg/L inhaled (no other data) or 18 and 23 hr before DIETHYLDITHIOCARBAMATE at 500 mg/Kg injection. CS <sub>2</sub> induced liver histopathology; hydropic degeneration of centri- lobular zone, only in rats pretreated with PB. Food deprivation for 24 hrs aggravated the CS <sub>2</sub> toxic effect, eg on Cytochrome P450.		
17.		
18.		
19. KEY WORDS  phenobarbital, carbon disulfide, starvation, combined stresses, hepatotoxicity, solvents, serum enzymes, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0357
4. TITLE (and Subtitle) Ethanol Potentiation of Halogenated Aliphatic Solvent Toxicity		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Cornish HH, Adefuin J		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Mich Schl Publ Hlth Ann Arbor		8. CONTRACT OR GRANT NUMBER(s) G; NIH OH-28
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1966
		13. NUMBER OF PAGES AND REFS 5P 10R
14. PUBLICATION Am Indust Hyg Assn J 1966 (1-2);27:57-61		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (M SD) were exposed to: ETHANOL at 5 g/Kg po 1x, then later: CARBON TETRACHLORIDE at 50, 100, 250, 1000, 10,000 ppm vapors; or TRICHLOROETHYLENE (data not avail) or PERCHLOROETHYLENE (no data) or METHYLCHLOROFORM (no data). EtOH pretreatment 18 hr before potentiates the toxicity & liver pathology for CCl <sub>4</sub> and TCE in short exposures (but not PCE). With EtOH and CCl <sub>4</sub> from 100-10,000 ppm for 2 hrs there is no change in serum enzymes SGOT & SGPT. EtOH 8 hrs before 25,50 ppm CCl <sub>4</sub> or 100 ppm TCE shows no potentiation, but does so when 2 hrs before 100 ppm CCl <sub>4</sub> or 4 hrs before 5000 ppm TCE.		
17. KEY WORDS ethanol, solvents, combined stresses, toxicity, carbon tetrachloride, trichloroethylene, perchloroethylene, methylchloroform, serum enzymes, hepatotoxicity, interactive responses		
18. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0010
4. TITLE (and Subtitle) Effects of Combined Exposure to Trichloroethylene and Alcohol on Mental Capacity		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Windemuller FJ, Ettema JH		8. CONTRACT OR GRANT NUMBER(s) G: TNO Health Orgzn for Sci & Appl Research
9. PERFORMING ORGANIZATION NAME AND ADDRESS NETHERLANDS: Univ Amsterdam, Instit Occ & Envir Health, Coronel Lab		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 8P 13R
14. PUBLICATION Int Arch Occup Environ Health 1978;41:77-85		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments human subjects (39 M adult 19-26 yr) were exposed to: TRICHLOROETHYLENE at 200 ppm inhaled for 2½ hr; and ETHANOL at 0.35 g/Kg po. Tests of behavioral performance included pursuit rotor task, binary light choices; physiological indices included heart rate and any arrhythmia. TCE + alcohol 17. impaired mental capacity, information handling; more than each stressor alone below its MAC. Heart rate is higher than with TCE or EtOH alone. More sinus arrhythmias are produced by the pair than by each alone. TCE metabolism is inhibited by alcohol, an event which can be dangerous in the work environment. 18.		
19. KEY WORDS trichlorethylene, ethanol, combined stresses, solvents, toxicity, performance testing, heart rate, sinus arrhythmia, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0056
4. TITLE (and Subtitle) "Degreasers Flush". Dermal Response to Trichloroethylene and Ethanol		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Stewart RD, Hake CL, Peterson JE		8. CONTRACT OR GRANT NUMBER(s) C: PHS NIOSH 99-72-84
9. PERFORMING ORGANIZATION NAME AND ADDRESS Med Coll Wisconsin Dept Envir Med Allen Bradley Lab Milwaukee		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 5P 4R
14. PUBLICATION Arch Environ Health 1974 (July);29:1-5		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments human subjects (7, healthy, 19-46 yr) were exposed to: TRICHLOROETHYLENE at 20, 100, 200 ppm vapors and skin exposure for 1, 3, or 7.5 hr; and ETHANOL, as beer (1 qt. Schlitz in 30 min). At 71 hr after TCE dose, subjects were rechallenged with EtOH (as 9 cc 100 proof vodka in orange juice), 17 (others were rechallenged at 2.5 and 5.5 hr). The special response as skin lesions, with vasodilation of skin vessels, as a transient event (flush). Repeated TCE exposures are needed before the alcohol challenge could initiate the dermal response. This TCE flush reaches max intensity 30 min after onset, then fades in 18. 60 min, on face, neck, shoulders, back.		
19. KEY WORDS trichloroethylene, ethanol, combined stresses, dermal response, toxicity, solvents, degreasers flush, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0141
4. TITLE (and Subtitle) Potentiation of Carbon Tetrachloride Hepatotoxicity by Ethanol and Cold		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Wei E, Wong CK, Hine CH		8. CONTRACT OR GRANT NUMBER(s) G: NIH GM-R1034
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cal Med Ctr Dept Pharmacol San Francisco		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1971
		13. NUMBER OF PAGES AND REFS 6P 24R
14. PUBLICATION Toxicol Appl Pharmacol 1971;18:329-344		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (F, SD) were exposed to COLD at 2-4°C or HEAT at 31-33°C; or ETHANOL 50% v/v water at 4 g/Kg by intubation. One of these three stresses was given 18 hrs before CARBON TETRACHLORIDE was given at 0.25 cc/Kg. Liver triglyceride accumulation and SGPT were measured. EtOH or cold exposure potentiated SGPT response to CCl <sub>4</sub> , but did not potentiate liver triglyceride accumulation response to CCl <sub>4</sub> . Thyroidectomy did not prevent the EtOH-CCl <sub>4</sub> interaction. EtOH treated rats at 32°C had a reduced response to CCl <sub>4</sub> .		
18.		
19. KEY WORDS ethanol, carbon tetrachloride, combined stresses, heat, cold, solvents, toxicity, liver triglycerides, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0138
4. TITLE (and Subtitle)  Potentiation of Carbon Tetrachloride Toxicity by Aliphatic Alcohols		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Cornish HH, Adefuin J		8. CONTRACT OR GRANT NUMBER(s) G: PHS OH-28
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Mich Schl Pub Hlth Dept Indust Hlth Ann Arbor		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1967
		13. NUMBER OF PAGES AND REFS 3P 5R
14. PUBLICATION  Arch Environ Hyg 1967;14:447-449		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT  In laboratory experiments rats (M SD) were exposed to: single ALIPHATIC ALCOHOLS, ethanol, methanol, n-propanol, butanol, in single doses at approx 40% of LD <sub>50</sub> , by intubation. At 2 or 16-18 hr later, CARBON TETRACHLORIDE at 1,000 ppm was given by inhalation for 2-2½ hrs. SGOT levels 24 hrs later were raised 3-200x 17 controls with the alcohols alone. CCl <sub>4</sub> alone caused no rise in SGOT. EtOH dose 16-18 hr prior to CCl <sub>4</sub> potentiated CCl <sub>4</sub> liver toxicity; this was not unique to the ethanol. Sec- and tert-butyl alcohols were more effective than n- or i- butyl alcohols. No 18 potentiation was seen if alcohol was given 2 hrs before exposure. The event needs some metabolic processing. In industrial practice since alcohol doses under 1 g/Kg are not potentiating, this event is not likely to occur in an 8 hr day.		
19. KEY WORDS  carbon tetrachloride, alcohols, combined stresses, toxicity, ethanol, methanol, n-propanol, butanols, SGOT, solvents, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0144
4. TITLE (and Subtitle) Effect of Carbon Monoxide or Hypoxia on Carbon Tetrachloride Hepatotoxicity		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Suarez KA, Carlson GP, Fuller GC		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Rhode Island Coll Pharmacy, Dept Pharmacol & Toxicol, Kingston		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-596
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Toxicol Appl Pharmacol 1972;23:789-791		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 3P 12R
		16. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (41) were exposed to: CARBON MONOXIDE AT 958 ppm for 90 min in chamber; or HYPOXIA, altitude (data not avail); then were given CARBON TETRACHLORIDE at 3799ppm or 5140 ppm for 30 min. 24 hrs later, blood was studied for SGOT, SGPT. SGOT and SGPT rise 3x levels of CCl <sub>4</sub> alone. 17 In hypoxic atmosphere, instead of CO, then CCl <sub>4</sub> , there was no change in enzymes due to combined events. The effect of CO on CCl <sub>4</sub> hepatotoxicity does not appear to be due to induced tissue hypoxia. But this pair, CO and CCl <sub>4</sub> can become an interactive industrial hazard. 18.		
19. KEY WORDS carbon monoxide, carbon tetrachloride, hypoxia, combined stresses, hepatotoxicity, SGOT, SGPT, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0359
4. TITLE (and Subtitle) Behavioral Changes after Long-term Exposure to Organic Solvents and Their Mixture. Determining Factors and Research Results		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s)  Lindstrom K		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Instit Occ Hlth Helsinki Dept Psychol		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 6P 22R
14. PUBLICATION  Scand J Work Environ Hlth 1981 (Suppl 4);7:48-53		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In occupational observations and clinical studies of workers in 5 industrial groups, car painters (100, av age 35.5 y) were exposed to mix of organic solvents including toluene and xylene at levels about 1/3 of Finnish TLV for av 14.8 yr; rayon viscose workers (206, av age 49.3 yr) were exposed chiefly to carbon disulfide, many times over 20 ppm, for av 15 yrs; printers (26, av age 39.5 yr) were exposed to toluene at 60-200 ppm (est) for av 19.7 yr; laminators (98, av 29.5 yr) were exposed to styrene at 7-4,700 mg/L for 5 yr; other workers with solvent mixes (56, av 38.8 yr) were exposed to low and high levels for av 9 yrs. 17. Most severe damage was from possible synergistic exposures to aromatic and halogenated HC mixes (behavioral). There were changes in all groups, in sensory, cognitive, and motor functions, with special effects, eg styrene on visuomotor acuity, C2S changes in verbal ability and finger-hand dexterity.		
19. KEY WORDS solvents, combined stresses, viscose industry, car painting, printing, styrene, carbon disulfide, toluene, behavioral change, cognitive function, sensory loss, psychomotor change, interactive responses		
20. NOTES Several different studies on these workers are reported in this journal, from 1976-1981		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0151
4. TITLE (and Subtitle) Behavioral Effects of Long-Term Exposure to a Mixture of Organic Solvents		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Hanninen H, Eskelinen L, Husman K, Nurminen M		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Instit Occup Hlth Helsinki		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 16P 38R
14. PUBLICATION Scand J Work Environ Health 1976;4:24-255		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In occupational observations car painters (102) from 6 garages were exposed in their work to mixtures of solvents approximately av 1/3 TLV for Finland, and including: TOLUENE 30 ppm, XYLENE 528 ppm, BUTANOL 68 ppm, etc. These workers were compared with a referent group of locomotive workers (102) without these solvent exposures. There was seen a general impairment in behavior, performance, and personality. Most affected were: visual intelligence (Wechsler), verbal memory (digit span), some psychomotor performance (tapping, reaction times, bar press), and reduced emotional reactivity.		
17.		
19. KEY WORDS solvents, combined stresses, car painters, toluene, xylene, butanol, toxicity, behavior, personality, intelligence, memory, psychomotor performance, reaction time, interactive responses		
20. NOTES Several different studies on these workers were reported in this journal from 1976 on.		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0152
4. TITLE (and Subtitle) Neurophysiological Effects of Long Term Exposure to a Mixture of Organic Solvents		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Seppalainen AM, Husman K, Martenson C		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Instit Occ Hlth Helsinki		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 11P 48R
14. PUBLICATION Scand J Work Environ Health 1978;4:304-314		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In occupational and clinical studies, car painters (102) from several garages were studied for responses to exposure to a mixture of solvents, and compared with a non-exposed referent of locomotive engineers (102). The solvent mixture included: TOLUENE, XYLENE, BUTYL ALCOHOL, METHYL-ISOBUTYL-KETONE, ACETONE, ETHANOL, ISOPROPANOL, local "WHITE SPIRITS". Exposure levels av 1/3 Finland TLV, with range of 4-212% of this value. Various neurological findings included: poly-neuropathies, reduction in nerve conduction velocities in peripheral and spinal cord motor neurones, changes in EEG (but many changes in EEG were also seen in the locomotive engineers), and signs of diffuse brain damage in 32 painters.		
19. KEY WORDS solvents, combined stresses, shop painters, neuropathology, toxicity, paints, toluene, xylene, ketones, alcohols, interactive responses		
20. NOTES Several different studies on these workers were reported in this journal, from 1976 on.		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0150
4. TITLE (and Subtitle) Symptoms of Car Painters with Long Term Exposure to a Mixture of Organic Solvents		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Husman K		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Kuopio Regnl Instit Hlth		8. CONTRACT OR GRANT NUMBER(s) G; Jahnsson Fdtn
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 14P 27R
14. PUBLICATION Scand J Work Environ Health 1980 (1);6:19-32		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In occupational observations car painters (M 102) in repair garages were compared with a referent group of locomotive engineers (without solvent exposures). The painters were exposed to a mixture of SOLVENTS including toluene, xylene, butyl acetate, methyl-isobutyl ketone, isopropanol, ethyl acetate, acetone, ethanol, and the local "white spirit". The exposure level was estimated av 1/3 Finland TLV, but ranged from 4-212% of this. There were findings of change in memory, vigilance, prenarctic syndromes, fatigue, and various neurological symptoms; as well as irritated skin and mucous membranes. Their data assembly considered the pre-existing diseases (eg tuberculosis, diabetes) present in 4 cases, also usage of cigarettes, alcohol, and medications. The acute symptoms eg of nausea and vomiting were found most during the work day. Effects were calculated as if the component solvents were additive, with potentiation uncertain-		
17. KEY WORDS solvents, combined stresses, shop painters, neuropathology, toxicity, paints, toluene, xylene, ketones, alcohols, interactive responses.		
20. NOTES Several different studies on these workers were reported in this journal, from 1976 on.		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0149
4. TITLE (and Subtitle) Clinical Neurological Findings among Car Painters Exposed to a Mixture of Organic Solvents		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Husman K, Karli P		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Kuopio Regnl Instit Occ Hlth		8. CONTRACT OR GRANT NUMBER(s) G: Jahnsson Fdtn
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Scand J Work Environ Health 1980 (1);6:33-39		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 7P 33R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In occupational observations, car painters (102) exposed in their work to TOLUENE, XYLENE, BUTANOL, TRICHLORETHYLENE, METHYLBUTYL-KETONE, various thinners each at levels estimated at 1/3 TLV. This group was compared with locomotive engineers (102) not exposed to this group of stresses. There were found CNS changes including abnormal vibration sensitivity, with 43% painters having increased thresholds at about 100 Hz, also decreases to light touch and pain sense. There was also ataxia, tremor, rapidly alternating movements of the finger; also dizziness, fatigue; difficulties in concentration, impaired memory, and reduced speed of response.		
17. KEY WORDS solvents, combined stresses, car painters, trichloroethylene, butanol, methylethyl ketone, vibration sense. ataxia, toluene, xylene, interactive responses, neuropathology		
20. NOTES Several different studies on these workers are reported in this journal.		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0140
4. TITLE (and Subtitle) Neurophysiological Findings among Workers Exposed to Organic Solvents		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Seppalainen AM		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Instit Occup Hlth, Helsinki		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 5P 19R
14. PUBLICATION Scand J Work Environ Health 1981 (Suppl 4);7:29-33		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
18. EXTRACT In occupational observations and clinical studies, workers (200+) were exposed to these and other solvents: STYRENE (data not avail) CARBON DISULFIDE est range 10-30 ppm; M-XYLENE est range 100-200 ppm. Beyond the narcotic effects shown by most organic solvents, abnormal EEGs were usual among most exposed to solvents (excess slow theta waves at 4-7 Hz, sometimes localized). There was a slowing in nerve conduction velocity, changes in EMG, and various complaints indicating CNS or peripheral neural change. EEG changes are also caused by styrene (along with changes in mandelic acid), by m-xylene (occipital EEG changes), and C <sub>2</sub> S.		
19. KEY WORDS solvents, combined stresses, carbon disulfide, xylene, plastics workers, neuropathy, EEG, nerve conduction velocity, theta waves, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0200
4. TITLE (and Subtitle) Interaction between Drugs and Solvents as a cause of Fatty Change in the Liver		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Edling C		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS SWEDEN: Linkoping Univ Hosp, Dept Occ Med		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 2P 13R
14. PUBLICATION Brit J Indust Med 1982;39:198-199		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT Interactive responses to several chemicals by workers in three different trades are reported in case form. A shoemaker (52 yr) exposed to trichloroethylene, thinners, tetrahydrofurane for several yrs also regularly ingested Paraflex compound (which included acetylsalicylic acid, and dextrapropoxyphene). Liver 17 biopsy showed fatty changes, siderosis, enlargement, and persistent increase in ALAT. A painter (52 yr) exposed to various solvents and thinners, received digoxin, verpamil (isoptin), paracetamol (Lunedon). He had at various time been an inpatient for cholecystitis, slipped disc, and cardiac infarction. Liver biopsy 18 showed fatty changes, and he had increased ALAT and ASAT. Another painter (42 yrs) exposed to solvents, taking digoxin, hydralazine, propranolol, and with a history of hypertension and cardiac enlargement, showed liver fatty changes, also raised ALAT and ASAT.		
19. KEY WORDS solvents, drugs, combined stresses, acetylsalicylic acid, dextropropoxyphene, shoemaking, industrial painting, toxicity, liver pathology, metabolism, interactive responses.		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0249
4. TITLE (and Subtitle) Influence of Carbon Disulfide and Thiurams on Ethanol Elimination and Acetaldehyde Production		5. TYPE OF REPORT & PERIOD COVERED Abstract
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Freundt KJ, Netz H		8. CONTRACT OR GRANT NUMBER(s) G: Deutsche Forschungsgemeinschaft
9. PERFORMING ORGANIZATION NAME AND ADDRESS W GERMANY (FR): Univ Wurzburg, Instit Toxicol-Pharmacol		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 1P no R
14. PUBLICATION Naunyn Schmiedebergs Arch Pharmacol 1973 (Suppl);277:r18 (abstract)		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies with rats (F Wistar adult), they were exposed to: ETHANOL at 2 g/Kg IP, then CARBON DISULFIDE at 20, 400 ppm inhaled 8 hr. This exposure did not change blood alcohol elimination rate. EtOH fall is associated with acetaldehyde (AcEt) rise plateau. After the same EtOH CS <sub>2</sub> exposure was repeated at 400 ppm for 8 hr, in 3, 6, 12 exposures at 2 day intervals. There was no change in EtOH elimination. When DIMETHYLDITHIOCARBAMATE at 50 mg/kg or DIET-DITHIOCARBAMATE at 50 mg/Kg were given IP, 20 min later AcEt levels went up 3X. TETRAMETHYLTHIURAM DISULFIDE at 0.06-1.0 g/Kg given orally raised AcEt, with EtOH elimination slightly retarded only after 0.25 and 1.0 g/Kg. DISULFIRAM at 1g.Kg oral 16 hr before EtOH load raised AcEt to 5X without effect on EtOH elimination.		
17. KEY WORDS carbon disulfide, thiurams, ethanol, acetaldehyde, toxicity, metabolism, dimethyldithiocarbamate, diethyldithiocarbamate, tetramethylthiuram disulfide, disulfiram, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0248
4. TITLE (and Subtitle) Influence of Inhaled Carbon Disulfide on Acetaldehyde Production and Liver Function in Alcoholized Mice		5. TYPE OF REPORT & PERIOD COVERED Abstract
7. AUTHOR(s) Freundt KJ, Lieberwirth H		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS W GERMANY (FR): Univ Wurzburg Instit Toxicol-Pharmacol		8. CONTRACT OR GRANT NUMBER(s) G: Deutsche Forschungsgemeinschaft
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Naunym Schmiedbergs Arch Pharmacol 1974 (Suppl);282:R21 (abstract)		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 1P no R
		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments human subjects (M adult) were exposed to: CARBON DISULFIDE at 20 ppm for 8 hr; also ETHANOL at levels to maintain blood at 0.7% EtOH. This level did not change with CS <sub>2</sub> up to 40 or 80 ppm. Blood acetaldehyde was 2X normal at 24 hr after end of 8 hr exposure to CS <sub>2</sub> at 22 ppm. CS <sub>2</sub> at 20 ppm for 8 hr/day x 5 days raises blood acetaldehyde about equal to one exposure to CS <sub>2</sub> at 80 ppm in 8 hr. There is no evidence of an "antabuse" syndrome (inhibited aldehyde dehydrogenase). After one or more CS <sub>2</sub> doses, total serum bilirubin rose to 2X normal in alcoholized subjects; total protein and uric acid were at the upper limits of normal.		
17. KEY WORDS carbon disulfide, ethanol, combined stresses, antabuse syndrome, aldehyde dehydrogenase, acetaldehyde, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0130
4. TITLE (and Subtitle) Blood Acetaldehyde in Alcoholized Rats and Humans during Inhalation of Carbon Disulfide Vapor		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Freundt KJ, Lieberwirth K, Netz H, Pohlmann E		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS W. GERMANY (FR): Univ Wurzburg Instit Toxicol-Pharmacol		8. CONTRACT OR GRANT NUMBER(s) G: Deutsche Forschungsgemeinschaft
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Int Arch Occ Environ Health 1976;37:35-46		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 12P 27R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies, separately with rats and humans: rats (F,Wistar) were exposed to: CARBON DISULFIDE at 20ppm in air 8 hr; also ETHANOL 2g/Kg IP for 4 hr. Human subjects (12 M 20-32 yr) were exposed to: CS <sub>2</sub> at 20, 40, 80 ppm in air for 8 hr; with EtOH at start at 0.57 cc/Kg in orange juice 1 X than 0.047 cc/Kg every 15 min, then for 16-24 hr, after 8 hr of CS <sub>2</sub> . (These inhalations were to simulate 1 work week). Rats and man were similar in sensitivity to CS <sub>2</sub> after EtOH. CS <sub>2</sub> induces inhibition of aldehyde dehydrogenase in blood. When EtOH is taken blood acetaldehyde rises. EtOH use at 16-24 hr after 8 hr of CS <sub>2</sub> causes an extra rise of blood acetaldehyde. There are no interactions between EtOH at 0.8% and CS <sub>2</sub> 10 ppm (like antabuse effect). In rats loaded with EtOH, blood acetaldehyde rises after 1 short 20 ppm CS <sub>2</sub> dose.		
19. KEY WORDS carbon disulfide, ethanol, combined stresses, acetaldehyde, toxicity, aldehyde dehydrogenase, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0008
4. TITLE (and Subtitle)  The Effect of Alcohols and Toluene upon Methylene Chloride-Induced Carboxyhemoglobin in the Rat and Monkey		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Ciuchta HP, Savell GM, Spiker RC Jr		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Gillette Med Eval Labs, Rockville MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 7P 20P
14. PUBLICATION  Toxicol Appl Pharmacol 1979;49:347-354		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (50+ SD) and monkeys were exposed to:ETHANOL, METHANOL, ISOPROPANOL, TOLUENE, by inhalation, each in range to 11,000 ppm; then METHYLENE CHLORIDE at 50, 500, 5000 ppm vapors or IP in 1 hr exposure. In rats (sacrificed 2, 4, 6, 8 hr post exposure) MeCl 50-5000 ppm forms COHb in a linear dose-response. MeCl at 5000 ppm for 1 hr + Ethanol inhibits formation of COHb at 1350 and 8000 ppm, but does not alter levels at 11,000 ppm. Methanol given IP 30 min before MeCl at 5000 ppm inhibits COHb. In monkeys, all solvents tested produce inhibition of MeCl-induced COHb. MeCl to 1000 ppm 3 hr + MeOH 330 ppm causes peak COHb levels. MeCl 4600 ppm + MeOH 4300 ppm + T 1800 ppm inhibits COHb as in rat. MeCl 4600 ppm alone 4 hr causes peak COHb. There is no MeOH potentiation of MeCl COHb in rat or monkey, but there is in man. Rat and monkey meOH potentiation of COHb is not a good model for man.		
19. KEY WORDS methylene chloride, alcohols, combined stresses, methanol, ethanol, isopropanol, toluene, carboxyhemoglobin, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0372
4. TITLE (and Subtitle) Methyl Chloride and Diazepam Effects on Performance		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Putz-Anderson V, Setzer J, Croxton JS, Phipps FC		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIOSH Taft Labs, Cincinnati OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 7P 14R
14. PUBLICATION Scand J Work Environ Health 1981;7:8-13		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments on human subjects (39M, 17F, 18-32 yr), METHYL CHLORIDE at 100, 200 ppm (route unknown) was given for 3 hr; and DIAZEPAM at 10 mg oral was given, in treatments with each or both. Diazepam reduces by 10% scores on behavioral performance (visual vigilance, time discrimination, eye-hand coordination, mental alertness). MeCl at 200 ppm alone has only a marginal effect on performance. But D + MeCl show impairment which is additive.		
17.		
18.		
19. KEY WORDS methyl chloride, diazepam, combined stresses, toxicity, behavioral effects, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0016
4. TITLE (and Subtitle)  Phenobarbital and Organic Solvent Toxicity		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Cornish HH, Ling BP, Barth ML		8. CONTRACT OR GRANT NUMBER(s)  G: PHS NIOSH-348
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Univ Mich Schl Pub Hlth Dept Envir & Industr Hlth, Ann Arbor		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 5P 26R
14. PUBLICATION  Am Industr Hyg <sup>ASSN</sup> J 1973;34:487-492		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (M) were exposed to: PHENOBARBITAL 50 mg/Kg IP in pretreatment i-2 days before reposure to one of the following: CARBON TETRACHLORIDE at 0.01-0.06 cc/Kg; or CHLOROFORM at 0.1, 0.3, 0.5 cc/Kg; or METHYLENE CHLORIDE at 0.2-1.0 cc/Kg; or METHYL CHLOROFORM at 0.3-2.0 cc/Kg; or TRICHLOROETHYLENE at 0.3-2.0 cc/Kg; or PERCHLOROETHYLENE at 0.3-2.0 cc/Kg. The PB is a liver microsome enzyme inducer. CCl <sub>4</sub> toxicity is associated with metabolism eg to CO <sub>2</sub> and free radicals. High doses inhibit liver metabolizing enzyme systems. PB potentiated toxicity of CCl <sub>4</sub> (doses as low as 0.025-0.05 cc/Kg); the latter dose + PB changes SGOT, causes centrilobular fatty infiltration of liver. PB also potentiates toxicity of CH <sub>2</sub> Cl <sub>2</sub> . PB + CHCl <sub>3</sub> raises SGOT 100 X CHCl <sub>3</sub> alone.		
19. KEY WORDS phenobarbital, solvents, combined stresses, carbon tetrachloride, chloroform, methylene chloride, methyl chloroform, trichloroethylene, perchloroethylene, SGOT, toxicity, interactive responses.		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0009
4. TITLE (and Subtitle) The Joint Toxic Action of Perchloroethylene with Benzene or Toluene in Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Withey RJ, Hall JW		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS CANADA: Hlth Prot Br, Food Directorate, Ottawa		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 10P 23R
14. PUBLICATION  Toxicol 1975;4:5-15		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments rate (600 M) were exposed to: PERCHLOROETHYLENE, at 3.9 g/Kg po, alone, or with either: BENZENE at 3 g/Kg po or TOLUENE (dose not avail). The treatments included several combinations and several dose levels of each. In the assessment of LD <sub>50</sub> and tests of additive joint toxicities, 17 a rigorous statistical probit design was used. PCE enhances the toxicity of B, in a slightly less than additive way. PCE also augments T toxicity (with other effects on nervous system). The departures in additivity have unknown mechanisms, not predictable, nor describable in usual terms of synergy or poten- 18. tiation.		
19. KEY WORDS perchloroethylene, benzene, toluene, combined stresses, toxicity, solvents, neuropathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0021
4. TITLE (and Subtitle) Trichloroethylene in Combination with CNS Drugs. Effects on Visual Motor Tests		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Univ Iowa Coll Med Dept Int Med Iowa City		8. CONTRACT OR GRANT NUMBER(s) G: NIH HE-T5577
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1970
		13. NUMBER OF PAGES AND REFS 5P 12R
14. PUBLICATION  Arch Environ Health 1970;20:462-467		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory experiments human subjects (6 M, 21-45 yr) were exposed to: TRICHLOROETHYLENE at 300, 1000 ppm by inhalation, prior to dose of: ANAHIST (THONZYLAMINE HCl) at 50 mg oral, alone or after TCE, and 30 min before performance tests below; or MEPROBAMATE (EQUANIL) given at 800 mg orally, alone or + TCE, immediately before performance test; or ETHANOL at 35 cc/70 Kg orally over 20 min. Performance tests included steadiness, flicker fusion, depth perception, and various illusions. Anahist alone had no effects. Equanil alone impairs other performances: learning, driving skills (but showed no special effects in the lab). TCE did not augment these CNS depressant effects. TCE effects themselves were not enhanced by Anahist or Equanil, on flicker fusion, pegboard testing, but TCE in chronic doses yields intolerance to ethanol. TCE causes potentiation in CNS drugs, and can be a factor in the workplace since 1/3-1/2 adults use these drugs.		
19. KEY WORDS  trichloroethylene, ethanol, Equanil, Thonzylamine, combined stresses, toxicity, psychoactive drugs, behavioral performance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0364
4. TITLE (and Subtitle) Reciprocal Metabolic Inhibition of Toluene and Trichloroethylene in Vivo and in Vitro		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Ikeda M		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS JAPAN: Kyoto Univ Fac Med Dept Publ Hlth		8. CONTRACT OR GRANT NUMBER(s) G: Fujiwara Fdtn
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Intl Arch Arbeitsmed 1974;33:125-130		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 6P 17R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (F) were exposed to: PHENOBARBITAL, at 37.5 mg/Kg IP for 4 days in preconditioning to stimulate max enzyme activities in the liver; then TOLUENE at 430 mg/Kg IP; or TRICHLOROETHYLENE at 730 mg/Kg; or a mix of these two (T + TCE). TCE + T cause suppressed excretion of hippuric acid ( a main metabolite of T) but reduce the amount of urinary trichloro-compounds (from TCE). TCE is a non-competitive inhibitor of side chain hydroxylation of T, and the reverse is also true. In other studies, T in rats suppresses biotransformation of benzene to phenol, also styrene to hippuric acid. There is also discussion of kinetics of absorption and excretion in the lung, and of processes in microsomal oxidation.		
19. KEY WORDS phenobarbital, toluene, trichloroethylene, combined stresses, toxicity, enzyme induction, hippuric acid, metabolic inhibition, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0125
4. TITLE (and Subtitle) Phenobarbital-Induced Protection against Toxicity of Toluene and Benzene in the Rat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Ikeda, Ohtsuji H		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS JAPAN: Kyoto Univ, Fac Med, Dept Pub Hlth		8. CONTRACT OR GRANT NUMBER(s) G: Ministry of Educ G: Fujiwara Fdtn
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1971
		13. NUMBER OF PAGES AND REFS 14P 27R
14. PUBLICATION Toxicol Appl Pharmacol 1971;20:30-43		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (F Wistar) were exposed to: PHENOBARBITAL at 75 mg/Kg IP 1x/day for 4 days, pretreatment; then TOLUENE at 0.43 g/Kg IP; or BENZENE at 0.44 g/Kg IP. PB shortened the narcotic action of T, reduced the leukopenic action of B, and generally enhances drug metabolism and thus reduces toxicity. PB, via hepatic microsomes, raises T side chain hydroxylation, towards benzyl alcohol; and raises B aromatic hydroxylation to phenol. PB can thus be used in therapy of solvent intoxication by its induction of drug metabolizing enzymes.		
17. 18.		
19. KEY WORDS phenobarbital, toluene, benzene, combined stresses, liver enzymes, metabolism, toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0100
4. TITLE (and Subtitle) Combined Effects of some Chlorohydrocarbons		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Tsulaya VR, Bonashevskaya TI, Shaipak VM, Zyкова VV		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: Instit Hyg Moscow		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 3P 3R
14. PUBLICATION Gig sanit (USSR) 1979 (8);20-22		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (M albino) were exposed to: 1,2-DICHLOROPROPANE (DCP); 1,2,3-TRICHLOROPROPANE (TCP); or PERCHLOROETHYLENE (PCE). No doses were available, but each is given in 6 concentrations in various combinations, by inhalation through 7-86 days. Measurements were made of body wt, catalase and cholinesterase activity, RBC and WBC counts, and of neural activity. Combined effect calculations from exposures were made using Finney's formula, and effects were found to be additive.		
17.		
18. KEY WORDS dichloropropane, trichloropropane, perchloroethylene, combined stresses, Finney's equation, cholinesterase, catalase, toxicity, hematology, solvents, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0105
4. TITLE (and Subtitle) On the Combined Action of 2,6-Dimethyl-phenol and Methanol (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Larionov AG, Broitman AY		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: Novosibirsk (site not given)		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 4P 5R
14. PUBLICATION Gig trud (USSR) 1975 (11);27-30		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments rats (albino) were exposed to: METHANOL (no data given); also 2,6-DIMETHYLPHENOL (no data). Three treatments were: 70% M + 30% DMP, 50% M + 50% DMP, 30% M + 70% DMP, all treatments intragastric in 4 doses. The measured and calculated LD <sub>50</sub> s were determined for the mixtures. Most mixtures show a reduced LD <sub>50</sub> or MPL compared with the individual or summed doses for the components. (potentiation). "Potentiation Coefficients" for the mixes were: 2.70 for 70M/30DMP, 2.38 for 50M/50DMP, and 1.94 for 30M/70DMP. In other studies with chronic inhalation exposure with endpoint the duration of swimming, the same potentiations were seen. No other data were available. Multifactorial and multiregression analyses were discussed.		
19. KEY WORDS methanol, 2,6-dimethylphenol, combined stresses, toxicity, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER AC347
4. TITLE (and Subtitle) Exposure to Xylene and Ethyl benzene. I. Uptake, Distribution, and Elimination in Man		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Astrand I, Engstrom J, Ovrum P		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS SWEDEN: Dept Occup Hlth, Nat Bd Occup Safety & Hlth, Stockholm		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 10P 14R
14. PUBLICATION Scand J Work Environ Hlth 1978;4:185-194		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (12 M, healthy, 19-35 yr) were exposed to XYLENE (an industrial mixture including: ethylbenzene 40.4%, p-xylene 1.4%, m-xylene 49.4%, o-xylene 8.8%). One group received X at 870 mg/m <sup>3</sup> (200 ppm) continuous exposure, while at rest for 30 min, then physical EXERCISE at 50, 100, 150 Watts for 90 min (X exposure also). A second group received 435 mg/m <sup>3</sup> (100 ppm) while at rest 30 min, then during 90 min of exercise. In both dose groups, about 60% X was taken up in the lungs, and with increasing work (and ventilation) more X was taken up. Analyses showed tissues in which solubilities were higher took up these solvents, in relation to their dose fraction and differences in solubility. Beyond this, there were no combined effects.		
19. KEY WORDS industrial xylene, combined stresses, ethylbenzene, m-xylene, o-xylene, p-xylene, exercise, ventilation, solubility, interactive responses		
20. NOTES For Part II (Adipose tiss) see Engstrom 1978 For Pt III (Neural tiss) see Gamberale 1978		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0308
4. TITLE (and Subtitle) Petroleum Hydrocarbon Toxicity Studies. V. Animal and Human Responses to Vapors of Mixed Xylenes		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Carpenter CP, Kinkead, ER, Geary DL Jr, Sullivan LJ, King JM		8. CONTRACT OR GRANT NUMBER(s) G:Amer Petrol Instit
9. PERFORMING ORGANIZATION NAME AND ADDRESS Carnegie-Mellon Instit Res, Chemical- Hygiene Fellowship, Pittsburgh PA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 16P 9R
14. PUBLICATION  Toxicol Appl Pharmacol 1975;33:543-558		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments MIXED XYLENES were given to several animal species. The xylene mix included: meta-xylene 65.01%, para-xylene 7.84%, ethylbenzene 19.27%, ortho-xylene 7.63%, toluene 0.14%, C9+ aromatics 0.04%, and non-aromatics 0.07%. Cats (4 M mixed breed) were given MX at 41/L (route not avail) and all died in 2 hrs, after salivation, ataxia, spasm, and other CNS changes. Rats given 43 mg/L (6000 ppm) had 100% mortality, starting at 2.5 hr; with dose of 580 ppm they had no mortality in 2.5 hr. Beagles given MX at 0.77, 2.0, 3.5 mg/L 6 hr/day for 5 d/wk for 13 wk showed no real effects. The effects of these mixtures are further discussed.		
19. KEY WORDS mixed xylenes, combined stresses, solvents, toxicity, neuropathology, interactive responses		
20. NOTES ERK 1979 to Tox Hazards Res Unit, WPAFB JMK 1979 to NY State Vet Coll, Cornell Univ Ithaca NY		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0047
4. TITLE (and Subtitle) Combined Effects of Diazepam and Alcohol on Mental and Psychomotor Functions		5. TYPE OF REPORT : PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Morland J, Setekleiv J, Haffner JF, Stromsaether CE, Danielsen A, Wethe GH		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NORWAY: Univ Oslo Instit Pharmacol; Roy Norweg AF Instit Av Med; Nat Instit Forensic Toxicol Oslo		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 11P 6R
14. PUBLICATION  Acta Pharmacol Toxicol 1974;34:5-15		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory studies human subjects (8M, 24-30 yr) were exposed to: DIAZEPAM (D), 10 mg/70 Kg oral as 2 mg tabs; also ETHANOL (E) 0.78 cc 96% Et/kg, diluted to 30% v/v. These were given in various sequences, with several psychomotor and cognitive tests taking 1-3 hrs for series of 10 min tests. Each alone (D),(E) reduced concentration, attention; E+D augmented these subjective impressions. E reduced a hand tracing score, increased various error rates. D markedly impaired psychomotor functions, and reduced flicker fusion score. E + D further reduced scores of simple psychomotor and complex coordination tests. D itself impairs these performances, and enhances synergistically effect of E.		
19. KEY WORDS  diazepam, ethanol, combined stresses, psychomotor functions, cognitive performance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0296
4. TITLE (and Subtitle)  Interaction of Chloral Hydrate and Ethanol in Man. Metabolism		5. TYPE OF REPORT & PERIOD COVERED  Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Sellers EM, Lang M, Koch-Weser J, LeBlanc E, Kalant H		8. CONTRACT OR GRANT NUMBER(s) G: Burroughs-Wellcome G: Addctn Res Fdtn, Ontar
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Harvard Med Schl, Depts Med & Pharmacol at Mass Gen Hosp, Boston, MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 13P 38R
14. PUBLICATION  Clin Pharmacol Therapeut 1972;13:37-49		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies human subjects (5M, fit, 21-29 yr) were exposed to: ETHANOL at 0.5 gm/Kg diluted with orange juice; also CHLORAL HYDRATE at 15 mg/Kg. Treatment conditions were: E; E ½ hr after C; C; C for 7 days, last C dose 12 hr before E. E, if given 30 min after C (relative to C alone caused higher and longer conc of plasma trichlorethanol and urine TCethanol glucuronide. C affects E metabolism, and causes peak plasma E conc to be reached earlier and stay higher than E alone. The higher blood E is due to competitive inhibition of alcohol dehydrogenase by TCet. E stimulates NADH production, so increases rate of chloral hydrate reduction to TCet by liver alcohol dehydrogenase. The metabolism of both is interactive, altered by combined administration.		
19. KEY WORDS  ethanol, chloral hydrate, combined stresses, NADH metabolism, detoxication, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0109
4. TITLE (and Subtitle) Effects of Alcohol, Carbon Monoxide, and Trichloroethylene on Mental Capacity		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Ettema JH, Zielhuis RL		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS NETHERLANDS: Univ Amsterdam Fac Med, Coronel Lab		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 16P 8R
14. PUBLICATION  Int Arch Occup Environ Hlth 1975;35:117-132		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT <p>In laboratory studies human subjects (M, ages 20-30 yrs) were exposed to: ETHANOL, 20 gm, as 80 or 120 cc on an empty stomach); also CARBON MONOXIDE at 175 ppm for 1,90,180 min; or TRICHLORO-ETHYLENE at 10,75,300 ppm for 135-150 min. These are given individually, and their effects compared. Ethanol as a reference substance at levels over 0.3 g/L caused marked decrease in performance on a variety of psychomotor functions. CO and TCE here had no effect on performance. The potential effects on performance of these substances (each separately at doses in occupational or "social range) in combined effects exceeding tolerance, have not been studied here.</p>		
19. KEY WORDS ethanol, carbon monoxide, trichloroethylene, combined stresses, mental capacity, psychomotor performance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0267
4. TITLE (and Subtitle)  Synergism, with Special Reference to Central Nervous System Depressants		5. TYPE OF REPORT & PERIOD COVERED  Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Rossi GV		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Phila Coll Pharmacy & Sci, Dept Pharmacol, Phila PA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE  1963
		13. NUMBER OF PAGES AND REFS 14P 220R
14. PUBLICATION  J Pharmaceut Sci 1963 (9);52:819-832		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT Concepts of interaction, synergy, potentiation in the pharmacological context are discussed in detail. Examples of these interactions, among analgesics, narcotics and narcotic antagonists, anesthetics, hypnotics are considered.		
17.		
18.		
19. KEY WORDS  therapeutic drugs, multiple drug administration, work-drug interactions, analgesics, antagonists, anesthetics, hypnotics, biotransformation, synergy, potentiation, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0240
4. TITLE (and Subtitle) Anticipating the Hazards of Worker Self-Medication		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Couri D, Milks MM		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Ohio State Univ Coll Med Dept Pharmacol Columbus OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 6P 10R
14. PUBLICATION Occup Hlth Safety 1980 (6);49:55-60		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT <p>Several problems of worker illnesses and injuries for which over-the-counter and non-prescription therapeutic remedies are sought were discussed. Interactions between prescription drugs taken by many, the related illnesses or conditions, the OTC medications, and work performance are considered. Modes of interaction are discussed, and examples provided among remedies sought for dermatitis, pulmonary disorders, rhinitis, head injuries &amp; musculoskeletal aches, infectious disease, GI discomforts, and the like. Many examples are given of clear problems caused by the indiscriminate use of self-medication and the possible extension of hazard on the job.</p>		
19. KEY WORDS therapeutic drugs, self-medication, work-medication interactions, combined stresses, dermatitis, neomycin, peptic ulcer, cimetidine, alcohol, coffee, diazepam, tetracycline, photosensitivity, depression, pulmonary disorders, antihistaminics, chlorpheniramine workplace combined stresses, interactive reponses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0273
4. TITLE (and Subtitle) Potential Effects of Medications at Work. 1. Pharmacology		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s)  Silverman H		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Lenox Hill Hosp Pharmacy Svc NY NY		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 3P 3R
14. PUBLICATION  Occup Hlth Safety 1981 (2);50:48-49,52		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
17. EXTRACT This deals with those drugs taken by workers as legitimately prescribed for treatment of illness by private physicians or health maintenance services. There are discussed several classes of drugs commonly taken, their primary and side effects, their impact on function in the working environment, on psychomotor performance, on energy, on physiological processes; and the combined effects of these prescription drugs, the illnesses for which they are intended, OTC drugs which may be taken concurrently, and various hazards and stresses on the job which may then become real dangers. Classes of substances discussed are: 18. hypnotic drugs, antianxiety drugs, antipsychotics, and anti-convulsants.		
19. KEY WORDS work-medication interactions, hypnotics, antianxiety drugs, antipsychotic drugs, antidepressants, anticonvulsants, workplace combined stresses, interactive responses		
20. NOTES Please refer to other parts of this survey: 2. Antimicrobial Drugs, OHS 1981 (4);50:33,35 and 3. Antimicrobial Drugs (contd), OHS 1981 (6);50:26-30,50		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0376
4. TITLE (and Subtitle) Potential Effects of Medications at Work. 2. Antimicrobial Drugs		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Silverman H		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Lenox Hill Hosp Pharmacy Svc NY NY		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 2P 4R
14. PUBLICATION Occup Hlth Safety 1981 (4):50:33,35		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT <p>This is the second of a series dealing with prescription drugs used by workers for treatment of ongoing disease. Several antibiotic classes are discussed. These include the penicillins, cephalosporins, erythromycin, the tetracyclines, and chloramphenicol. Several concepts are developed, around the joint impact on the worker and workplace concerning: the illness being treated, the primary and side effects of these drugs, OTC drugs selected and taken concurrently for other minor illness, and these drug effects, the combined drug interactions, and possible synergistic effects of these factors and toxic or other stresses in the workplace</p>		
17. KEY WORDS <p>work-medication interactions, penicillin, cephalosporins, erythromycin, clindamycin, lancomycin, tetracyclines, chloramphenicol, antimicrobial drugs, workplace combined stresses, interactive responses</p>		
18. NOTES <p>Please refer to other parts of this survey: 1. Pharmacology, OHS 1981 (2):50:48-49,52 and 3. Antimicrobial Drugs (contd), OHS 1981 (6):50:26-30,50</p>		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0377
4. TITLE (and Subtitle) Potential Effects of Medications at Work. 3. Antimicrobial Drugs (Cont'd)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Silverman H		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Lenox Hill Hosp Pharmacy Svc NY NY		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 4+ P, 1+ R
14. PUBLICATION Occup Hlth Safety 1981 (6);50:26-30,50		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT This is the third of a series dealing with prescription drugs used by workers for treatment of ongoing disease, and interacting with their performance in the work environment. The group here includes: aminoglycoside antibiotics (and such factors as ototoxicity), the sulfonamides, antitubercular drugs such as isoniazide, ethambutol, rifampin, and antifungal preparations. The interactions possible converging on workplace safety and performance of these drugs, the illness for which they were given, OTC drugs possibly taken concurrently for minor ailments, their prime and side effects, hazards such as chemical toxics in the workplace and synergies and potentiations, are all considered.		
19. KEY WORDS work-medication interactions, aminoglycoside antibiotics, streptomycin, neomycin, kanamycin, ototoxicity, nephrotoxicity, sulfonamides, isoniazid, ethambutol, rifampin, amphotericin B, methenamine, antimicrobial drugs, workplace combined stresses, interactive responses		
20. NOTES Please refer to other parts of this survey: 1. Pharmacology, OHS 1981 (2);50:48-49,52 and 2. Antimicrobial Drugs, OHS 1981 (4);50:33,35		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0235
4. TITLE (and Subtitle) Interactions between Environmental Chemicals and Drug Biotransformation in Man		5. TYPE OF REPORT & PERIOD COVERED Review
7. AUTHOR(s) Alvares A		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Uniformed Services Univ, Dept Pharmac Bethesda MD		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Clin Pharmacokinetics 1978;3:462-477		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 16P 72R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
18. EXTRACT Some alterations in drug metabolism by such environmental chemicals as Lead, Insecticides, PCBs and PBBs, and their modes of action are discussed. Changes induced in therapeutic drug transformations by components of cigarette smoke and other sources eg of polycyclic hydrocarbons, also their relationships to altered drug bioavailability are considered. Other effects on systems of mixed function oxidases are discussed. Other interactions of nutritional components and drugs and their availability are considered.		
19. KEY WORDS drugs, chemicals, combined stresses, biotransformation, environment, smoking, lead, PCB, insecticides, benzo-a-pyrene interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0234
4. TITLE (and Subtitle) Pharmacological Implications of Microsomal Enzyme Induction		5. TYPE OF REPORT & PERIOD COVERED Review
7. AUTHOR(s) Conney AH		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Wellcome Res Labs, Tuckahoe NY		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1967
		13. NUMBER OF PAGES AND REFS 50P 379R
14. PUBLICATION Pharmacol Revs 1967 (3);19:317-366		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
17. EXTRACT A variety of topics are discussed: the characteristics of enzyme inducers; effects of enzyme induction on drug action; tests for enzyme induction, mechanisms of microsomal enzyme induction by polycyclic hydrocarbons and drugs; effect of drugs on electron transport systems in liver microsomes; enzyme induction variations in different species; hormone regulation of drug metabolism, special problems of chemical roxics, insecticides carcinogens, etc.		
18.		
19. KEY WORDS enzyme induction, liver microsomes, toxics metabolism, environmental hazards, barbiturates, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0265
4. TITLE (and Subtitle) Effect of Disease States on Plasma Protein Binding of Drugs		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Reidenberg M		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Temple Univ Schl Med Depts Med & Pharmacology Phila PA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 7P 19R
14. PUBLICATION Med Clinics North Amer 1974 (5);58:1103-1109		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT  This discusses the problems of achieving therapeutic concentration of desired drugs in the face of altered pharmacokinetics associated with various illnesses. In poor renal function with abnormal excretion, altered metabolic paths and physical chemistry, there are constraints particularly on binding with organic acids and bases. Hypoproteinemia modifies binding, raising the unbound fraction and increasing available drug and effect. Other events concerned with liver cirrhosis, and concurrent drug therapy, are considered.		
17.		
19. KEY WORDS  drugs, protein binding, therapeutics, renal function, cirrhosis, drug-disease interactions, combined environmental stresses, chemical-drug interactions		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0262
4. TITLE (and Subtitle) Drug Interactions		5. TYPE OF REPORT & PERIOD COVERED Review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Nies AS		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Vanderbilt Univ Schl Med Depts Med & Pharmacol Nashville TN		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 11P 35R
14. PUBLICATION Med Clin North Amer 1974 (5);58:965-975		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT Primary discussion is about pharmacokinetic interactions. Events which reduce amounts of drugs at site of action are discussed. These include reduced absorption, inhibition of transport to site of action, increased activity of drug metabolizing enzymes, and enhanced drug excretion. Activities which result in more drug agent delivered to action site include: altered protein binding, inhibitions of metabolism, and reduced kidney excretion. Among non-pharmacokinetic events discussed are interactions at common receptor sites on various cells, and especially on sensory receptors and neuromuscular junctions.		
17.		
18.		
19. KEY WORDS drugs, therapeutics, pharmacokinetics, metabolism, drug transport, protein binding, drug-chemical interactive responses		
20. NOTES		

DRUGS

COMBINED STRESS EXTRACTS

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0373
4. TITLE (and Subtitle)  Effects of Xylene and Alcohol on Vestibular and Visual Functions in Man		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Savolainen K, Riihimaki V, Vaeheri E, Linnoila M		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  FINLAND: Univ Helsinki, Dept Pharmacol and Instit Occup Hlth Helsinki		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 10P 39R
14. PUBLICATION  Scand J Work Environ Hlth 1980;6:94-103		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory experiments, human subjects (10 M fit av age 22.8 yr) received ETHANOL 0.4-0.8 g/Kg, then were exposed to M-XYLENE at 636 mg/m <sup>3</sup> or 1,218 mg/m <sup>3</sup> , in 4 hr inhalation. Since some solvents act via the vestibular apparatus, psychophysiological tests included disturbances in equilibrium (body sway etc), gaze deviation nystagmus, also extraocular muscle balance, critical flicker fusion. Xylene at the higher dose antagonized the ethanol effect on vestibular function. These combined effects do not follow the kinetics of the individual agents, so may sometime be additive or antagonistic.		
17.		
18.		
19. KEY WORDS ethanol, xylene, combined stresses, neuropathology, balance, vestibular apparatus, nystagmus, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0198
4. TITLE (and Subtitle) The Rate of Aniline Metabolism in Vivo in Rats Exposed to Aniline and Drugs		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Wisniewska-Knypl JM, Jablonska JK		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS POLAND: Instit Occup Med Dept Biochem Lodz		8. CONTRACT OR GRANT NUMBER(s) G: USPHS Occ Hlth Prgm Polish-Amer Agreeemnt
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  Xenobiotica 1975;5:511		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS
		15. SECURITY CLASS. (of this report)
16. EXTRACT  In laboratory studies rate (albino Wistar) were exposed to a complex array of drugs; with design including pre-treatment with PHENOBARBITAL SODIUM (microsomal enzyme inducer) at 80 mg/kg/day for 4 days IP; or CYCLOBARBITAL at 150 mg/kg/day x 4 days orally; or PHENACETIN at 1 g/kg/day x 6 or 14 days oral; or SKF-525-A (a microsomal enzyme inhibitor) stopped 30 min before "study" and given IP at 50 mg/kg; or 3,4-BENZPYRENE (microsomal enzyme inducer) given IP 45 mg/kg 72 hr before study. (Phenobarb, Cyclobarb, Phenac. were stopped 24 hrs before the study). ANILINE was given, at 150 mg/kg/d x 3d or 6d sq; or 50 mg/kg/d x 30d. Aniline metabolism in vivo stimulated by Phenobarb, benzpyr, inhib by SKF525A. Aniline metab vivo/vitro stim by cyclobarb & phenac.; pretreat with An. impaired An. met. in vivo. Other mixes stimulated Aniline metabolism.		
19. KEY WORDS  aniline, drugs, combined stresses, phenobarbital, cyclobarbital, phenacetin, benzpyrene, SKF-525A, metabolism, liver enzymes, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0279
4. TITLE (and Subtitle)  Comparative Effect of Three Antihistaminics and Ethanol on Mental and Motor Performance		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Hughes FW, Forney RB		8. CONTRACT OR GRANT NUMBER(s)  G; Pfizer
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Univ Indiana Schl Med Dept Pharmacol & Toxicol, Indianapolis		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1964
		13. NUMBER OF PAGES AND REFS 8P 9R
14. PUBLICATION  Clin Pharmacol Therapeut 1964;5:414-421		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT  In laboratory studies human subjects (16 students, ages 21-29 yrs) were exposed to: CLEMIZOL (Allercur, antihistaminic and tranquilizer) at 40 mg; DIPHENHYDRAMINE (Benadryl, antihistaminic and sedative) at 50 mg; or TRIPELENNAMINE (Pyrabenzamine, antihistaminic and sedative) at 50 mg. One of these three was selected in a particular pretreatment, in 4 capsule, one taken at noon and one at evening meal on day prior to test, then one at breakfast on test day and one 1 hr before test. At that time, ETHANOL was given, alone or with pre-treatment drug at eg 45 cc/68 Kg, 3 oz 100 proof bourbon, mixed, drunk in 30 min. Tests included: delayed auditory feedback, special reading, counting, speech, pursuit tracking. Ethanol impaired mental and motor performance, as expected. Antihistaminics alone did not impair mental performance. Effect of E was not impaired by C, but E potentiated D effects on pursuit test		
19. KEY WORDS ethanol, antihistaminics, combined stresses, tripelannamine, diphenylhydramine, clemizol, psychomotor performance, cognitive performance, interactive responses		
20. NOTES		

MISC/CHEMICAL  
COMBINED STRESS EXTRACTS

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0066
4. TITLE (and Subtitle) An Exploration of Joint Chemical Action: Twenty-seven Industrial Chemicals Intu- bated in Rats in all Possible Pairs		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Smyth HF Jr, Weil CS, West JS, Carpenter CP		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Carnegie-Mellon Univ, Mellon Instit, Pittsburgh, PA		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1969
		13. NUMBER OF PAGES AND REFS 8P 5R
14. PUBLICATION  Toxicol Appl Pharmacol 1969;14:340-347		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In lab studies with rats (350 pairs), the following substances were administered in pairs in various combinations, mixed 1:1 v/v and LD <sub>50</sub> oral dose ascertained and compared with individual LD <sub>50</sub> . These included: acetone, acetonitrile, acetophenone, acrylonitrile, aniline, butyl cellosolve, butyl ether, carbon tetrachloride, di- 17. ethanolamine, dioxane, ethanol, ethyl acetate, ethyl acrylate, ethylene glycol, formalin, isophorone, morpholine, nitrobenzene, phenyl cellosolve, polyethylene glycol, propylene oxide, tergitol nonionic XD, toluene, trichloroethylene, and Ucon fluid. The data were inserted into Finney's model equation to determine whether 18. the effects were additive. Nine pairs showed ratios of predicted to observed values of 0.23-0.4 (below additive) and nine were as high as 2.7-5.09 (supraadditive). The additivity condition requires that the regression lines for separate chemicals acting jointly be parallel and similar modes of action.		
19. KEY WORDS industrial chemicals, combined stresses, toxicity, lethality, additive models, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0214
4. TITLE (and Subtitle) Combined Action of Organophosphorus Pesticides and Increased Environmental Temperature on Short-Term Inhalation Studies in Rats. **		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Gohlke R, Grigorova R		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS E GERMANY (DDR): Central Instit Indust Med, Berlin-Lichtenberg		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  Int Arch Arbeitsmed 1973;31:309-317		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 19P 17R
		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT  In laboratory studies rats (M albino) were exposed to: TINOX at 4.2 mg/M <sup>3</sup> ; DIMETHOATE at 16 mg/M <sup>3</sup> , WOLFATOX at 0.8 mg/M <sup>3</sup> singly and together by inhalation for 8 days. Histology eg of lung and thyroid; histochemistry eg of liver enzymes; and morphometrics eg of thyroid and <sup>131</sup> I uptake and metabolism in thyroid were measured. In addition to the single or combined pesticides, the animals were exposed to HEAT at 35° C at the same time. The organophosphates given in a high temp environment resulted in a higher fatty degeneration of the liver, decreased non-specific esterases and succinic dehydrogenases, an increase in acid phosphatases and drop in thyroid wt. Action of Tinox + heat was the most striking.		
19. KEY WORDS  organophosphates, heat, combined stresses, liver function, toxicology, Tinox, Dimethoate, Wolfatox, insecticides, interactive responses		
20. NOTES Title continued: "... 2. Histological, Histochemical, and Morphometric Studies" (Ger)		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0023
4. TITLE (and Subtitle) Effects of Exposure to Acrolein Vapor in Hamsters Simultaneously Treated with Benzo(a)pyrene or Diethylnitrosamine		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Feron VJ, Kruyse A		8. CONTRACT OR GRANT NUMBER(s) G: Dutch Cigarette Industry Assn
9. PERFORMING ORGANIZATION NAME AND ADDRESS NETHERLANDS: TNO Central Instit Nutrit & Food Res, Zeist		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1977
		13. NUMBER OF PAGES AND REFS 15P 27R
14. PUBLICATION  J Toxicol Environ Hlth 1977;3:379-394		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, hamsters (252 M, 252 F, age 6 wks) were exposed to: ACROLEIN vapor, 4 ppm, by inhalation 7 hr/day, 5 day/w for 52 wks; and either DIETHYLNITROSAMINE (DENA), total dose of 2.1 uL 1 x/3 wk for 52 wks; or BENZO(A)PYRENE (BP), at 18.2 or 36.4 mg, 1 x/wk x 52 wks, with DENA or BP instilled intratracheally. Treatments involved combinations of A with BP or DENA. The subjects were studied at 81 wk for incidence of respiratory tract tumors. Acrolein alone caused growth retardation, hyperplasia of nose, temporary behavior changes, irritation of nose and eyes, hepatic cysts, testicular atrophy, some amyloidosis, kidney changes, but with no effects on carcinogenesis itself, nor on blood chemistry or hematology. Some hyperplasia in nose was noted. DENA caused respiratory tract tumors like A. BP + A produced only slightly higher incidence of BP tumors in the respiratory tract, with latent period shortened by A, which has cocarcinogenic effect		
17. KEY WORDS acrolein, benz(a)pyrene, diethylnitrosamine, combined stresses, carcinogenesis, lung pathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0133
4. TITLE (and Subtitle) Asthma due to Inhaled Chemical Agents- Epoxy Resin Systems Containing Phthalic Acid Anhydride, Trimellitic Acid, and Triethylene Tetramine		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s)  Fawcett IW, Taylor AJ, Pepys J		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS  ENGLAND: Brompton Hosp; Nat Heart & Chest Hosp.		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1977
		13. NUMBER OF PAGES AND REFS 14P 15R
14. PUBLICATION  Clin Allergy 1977;7:1-14		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory study workers with occupational asthma were ex- posed to fumes of certain epoxy resins (phthalic acid anhydride, triethylene tetramine, toluene diisocyanate, trimellitic acid These substances induced immediate asthmatic reactions.		
17.		
18.		
19. KEY WORDS  epoxy resins, additives, combined stresses, phthalic acid anhy- dride, trimellitic acid, triethylene tetramine, asthma, dermatitis, pulmonary pathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0346
4. TITLE (and Subtitle) Toxicologic and Acute Lethal Hazard Evaluation of Thermal Decomposition Products of Synthetic and Natural Polymers		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Alarie YC		8. CONTRACT OR GRANT NUMBER(s) G: NBS 5-9005
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Pittsburgh Grad Schl Pub Hlth Dept Indust Envir Hlth Pittsburg, PA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 12P 22R
14. PUBLICATION Toxicol Appl Pharmacol 1979 (2);51:341-362		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT A large group of thermal decomposition products from synthetic and natural polymers were screened. These products include: substances from polyurethane, polystyrene, isocyanate, phenol-formaldehyde, cellulose fiber, teflon, wool fibers. Thermal decay was done in a Lindbergh furnace heating the candidate materials to 600° C to simulate some fire conditions. The effluent from the furnace was cooled with air, and used to expose mice (M Swiss, arranged for head exposure only), to irritants for 10 min/test. Toxicity of these products depends on their decomposition temperature.		
17.		
18.		
19. KEY WORDS thermal decomposition products, polymers, combined stresses, polystyrene, polyurethan, isocyanate, irritants, pathology, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0076
4. TITLE (and Subtitle) External Respiration and Gas Exchange in Workers Exposed to the Effect of Lubri- cating Oil Aerosols (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Bruskin ZZ, Demchenko VG		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: Med Instit, Omsk		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Gig trud (USSR) 1975 (4);28-30		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 3P 12R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In an occupational study of machine tool operators and other workers (77 M & F, employed over 10 yrs), they were exposed to aerosols of lubricating oils, and sulfate coolants. Measurements of pulmonary function included vital capacity, max ventilation, and gas exchange. Chronic exposure to these substances produced decreases in max ventilation and vital capacity, and increases of oxygen consumption as a function of duration of exposure. The etiology of occupational lipid pneumonia, and the inhibition of phagocytosis under these stresses are discussed.		
17. KEY WORDS lubricating oils, aerosols, workplace exposures, combined stresses, machine tool operators, pulmonary functions, pneumonia, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0087
4. TITLE (and Subtitle) Effects Produced by Petroleum Oil Aerosols and By-Products Secondary to Thermal Oxidative Destruction... **		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Lutov VA, Chirkin AA, Gryaditsky YU, Vasilenko NI		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: Med Instit, Vitebsk		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 4P 5R
14. PUBLICATION  Gig trud (USSR) 1976 (2);33-37		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies rats (albino) were exposed to: THERMO-OXIDATION PRODUCTS from degradation of Hydrocarbons, at doses of 200,300, and 410 mg/M <sup>3</sup> ; also machine oil aerosols (doses not given). Exposure was 5 hr/day for 6 mo to single and combined substances. Each stressor appeared to have marked toxic effects: 17 with drop in blood pressure, cardiac a-v conductivity, oxygen consumption, inhibition of neutrophil phagocytic activity, decrease in activity of certain tissue enzymes, and inhibition of certain immunological reactivity in test animals. The thermo-oxidation products enhance the toxic effect of the oil aerosol in 18. combined exposure. No other data are available.		
19. KEY WORDS mineral oil, thermo-oxidative products, combined stresses, aerosols, carbon monoxide, hydrocarbons, neuropathology, cardiovascular pathology, toxicity, interactive responses		
20. NOTES ** Title continued: "...on the Functional State and Immunological Reactivity of Test Animal Systems" (Rus)		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0086
4. TITLE (and Subtitle) Assessment of the Degree of Hazards from Repeated Exposure to a Mixture of Volatile Products from Thermal Oxidation Breakdown of Lubricating Oils (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Litau VG, Yukhnovsky GD, Obukhova MF, Razinkin SM, Lekareva TA		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: Moscow (site not given)		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 2P 10R
14. PUBLICATION Gig trud (USSR) 1980 (5);46-47		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory studies mice (M albino) were exposed to a mixture of volatile products of thermal oxidation of greases. (No data were given on modes of production, components and their concentration.) Exposure was at 2 hr/day, 5 days/wk, for 1.5 mo by inhalation. After 1.5 mo of chronic exposure, the animals were given exposure to the volatile products at LC <sub>50</sub> concentration (not specified) in a single 4 hr dose. Measurements included cholinesterase activity, RBC, hemoglobin level, and certain aspects of behavior. No other data are reported		
18.		
19. KEY WORDS lubricating oils, thermo-oxidative products, cnvironmental hazards, combined stresses, volatile products, hematology, behavior, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0363
4. TITLE (and Subtitle) Acute Hepatic Injury by Vinyl Chloride in Rats Pretreated with Phenobarbital		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Jaeger RJ, Reynolds ES, Conolly RB, Moslen MT, Szabo S, Murphy SD		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harvard Schl Pub Hlth, Dept Envir Hlth Boston MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 3P 20R
14. PUBLICATION  Nature (Lond) 1974 (20)252:724-726		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT  In laboratory studies rats (M) were exposed to: VINYL CHLORIDE MONOMER (VCM) in air containing conc of 0.5, 5.0, 10.0 % VCM for 6 hrs; or in a variant, at 0.05, 5.0 & VCM for 6 hrs or 5 days. (VCM is used in plastic plants to make eg polyvinyl sheeting). Rats were pretreated with PHENOBARBITAL Sodium 0.1% in drinking water, starting 7 days before VCM. The dose of 100 mg/Kg/day is able to double Cytochrome P-450 and oxidative N-demethylase activity. These enzyme inductions can activate other halocarbons into hepatotoxicity. VCM alone (10%) initially increases activity of AKT (alanine-alpha-ketoglutarate transaminase) or SDT (sorbitol dehydrogenase). Pretreatment with PB + 5% VCM enhances the liver enzyme lesions, causes vacuolization of centrilobular parenchymal cells, jumbles of smooth endoplasmic reticulum, and focal necroses. With chronic dose (5 d) of VCM no further enzyme changes occur. Initial exposure to the toxic protects somewhat against reexposure		
19. KEY WORDS  vinyl chloride, phenobarbital, combined stresses, toxicity, plastics industry, liver injury, enzyme induction, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0064
4. TITLE (and Subtitle) Polycyclic Aromatic Hydrocarbons in Foundries		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Schimberg RW, Pfaffli P, Tossavainen A		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Instit Occ Hlth, Helsinki		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 7P 10R
14. PUBLICATION J Toxicol Environ Hlth 1980 (5-6);6:1187-1194		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT  In occupational observations the nature of iron foundry worker exposure to known carcinogens and cocarcinogens was explored. Foundry air/dust samples analyzed for polycyclic aromatic hydrocarbons (PAH) detected over 200 compounds; 50 were identified as PAH, including Benzo(a)pyrene (BAP). The latter was highest where pitch was used as the organic additive in molding sand; where BAP at 5.1 ug/M <sup>3</sup> was 50x that case where coal powder was used as the additive. The PAH variants are formed and released in extreme conditions of casting: 1400° C, high pressure, limited oxygen supply. The Ames assays on dust showed mutagenic activity, but lower than BAP, which can be used here as a hygienic marker.		
17. KEY WORDS polycyclic aromatic hydrocarbons, foundry workers, combined stresses, phenanthrene, anthracenes, dust, pitch, pyrene, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0298
4. TITLE (and Subtitle) Single Dose and Repeated Exposure Toxicity of a Complex Wastewater from Munitions Manufacturing Plants		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Tyson CA, Dilley JV, Sasmore DP, Spangford RJ, Newell GW, Dacre JC		8. CONTRACT OR GRANT NUMBER(s) C:DA MD-17-76-C-6050
9. PERFORMING ORGANIZATION NAME AND ADDRESS SRI Internatl, Menlo Park CA; Army Med Bioeng R & D Lab Ft Detrick MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 20P 16R
14. PUBLICATION  J Toxicol Environ Hlth 1982;9:545-564		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies, dogs, rats, mice were exposed to: 30 nitrotoluene analogs as found in CW (condensate waste water). A blend of these substances was suspended in acetone and mixed with suitable vehicle for oral ingestion. Dosage was carried to LD50 in single doses. For rats, these levels were: 447 mg/Kg (M) and 295 mg/Kg (F). Another series of repeated doses was done: for dogs 0.05, 0.5, 5.0 mg/Kg in a capsule/day x 26 wk; and in rats/mice 0.001, 0.1, 0.1 % of this mix, for 4 or 13 wks. There was produced compensatory anemia with reticulocytosis (severe in rats). Heinz body formation (common feature of nitrotoluene toxicity) was seen, other blood cell changes, pigments in liver cells atrophy and aspermia in testes, hyperplasia and inflammation in F repro organs, neurotoxic signs at high doses. In rats & mice, drop in food intake, body and organ wts; 2,4 & 2,6 dinitrotoluene the chief causes of toxic effects.		
17. KEY WORDS nitrotoluene analogs, wastewater, combined stresses, toxics, munitions production, neurotoxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0177
4. TITLE (and Subtitle) Asbestos and Lung Cancer: An Analysis of the Epidemiological Evidence on the Asbestos-Smoking Interaction		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Saracci R		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FRANCE: IARC (Internat Agcy Res on Canc) Lyons		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1977
		13. NUMBER OF PAGES AND REFS 9P 32R
14. PUBLICATION  Int J Cancer 1977;20:323-331		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT <p>Three concepts for asbestos-smoking interaction on human lung cancer production are discussed:  Excess incidence of lung Ca independently due to asbestos and smoking would be added together when both are present (additive)  Addition of each one of the two agents produces an increase in lung Ca incidence proportional to the effect of the other (multiplicative model).  Asbestos could only increase lung Ca in the presence of smoking (promotor model).  The additive model appears to the author the least plausible, from the data. The multiplicative model is consistent with multistage carcinogenic discrete-hits mechanisms; each factor can produce human lung Ca and act synergistically. Many studies are not comparable, are different in design, exposures, criteria, samplings.</p>		
19. KEY WORDS <p>smoking, asbestos, combined stresses, lung cancer, chrysotile, epidemiology, interactive response models</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0007
4. TITLE (and Subtitle) Role of Infective, Immunological, and Chronic Irritative Factors in the Development of Silicosis		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Chiappino G, Vigliani EC		8. CONTRACT OR GRANT NUMBER(s) G: Eur.Coal/Steel Commnty
9. PERFORMING ORGANIZATION NAME AND ADDRESS  ITALY: Univ Milan Clin Lavoro		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 5P 15R
14. PUBLICATION  Brit J Indust Med 1982;39:253-258		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory studies rats (220 SD pathogen-free) were exposed to: SILICA, Tridymite, particle size 1-2um, 50 mg in saline, intra-tracheally, 1 time; also ANTIGENS, horse ferritin at 25 mg, or horseradish peroxidase at 0.25 mg, inhaled, as immunological stressor factor; also INFECTION in these pathogen-free rats, by exposure in usual cages to endemic bacterial flora; also OZONE at 2 mg/m <sup>3</sup> 8 hr/day 5 days/wk for 6 or 12 mo, as irritant factor. With tridymite, in 3, 6, 12 mo granulomas (not silicosis) develop, without confluence or hyalinosis. If they are put into the infective environment after TD growths will be faster, more numerous, and silicotic. Exposure to O <sub>3</sub> also increases infection incidence so increases silicosis. Ferritin and peroxidase stimuli in the pathogen-free have no effect on development of silicosis. Bacterial flora are the major accelerators of silicosis here.		
19. KEY WORDS silica, infection, irritants, combined stresses, silicosis, pathogen-free animals, bacterial flora, peroxidase, ferritin, ozone, granulomas, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0209
4. TITLE (and Subtitle) Mixed Pneumoconiosis, Silicosis, Asbestosis, Talcosis, and Berylliosis		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Mark GJ, Monroe CB, Kazemi H		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harvard Med Schl Depts Path & Med, & Beryllium Case Registry, Mass Gen Hosp, Bost.		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Chest 1979 (6);75:726-728		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 3P 11R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT The mixes of mineral exposures encountered in various occupations are discussed. Coal miners drilling rock may develop silicosis-anthrocosis (sometimes called anthrosilicosis). Hematite miners and workers in iron foundries may develop siderosis-silicosis. Others get argyria-silicosis. In one unusual specific case, a patient, a metal worker and mold maker for BeCu ingots, was exposed also to talc and asbestos. He was also a smoker. After 6 yrs of pulmonary insufficiency, cyanosis, FEV 20% of normal and VC 33% of normal and death at age 48 yrs, his tissues showed not only silicosis nodules but talc crystals, asbestos, and beryllium deposits. Be itself give an underlying lymphocytic or granulomatous inflammation and interstitial fibrosis, sometimes without visible particles in lung tissues.		
19. KEY WORDS silicosis, asbestosis, pneumoconiosis, talcosis, berylliosis, lung pathology, combined stresses, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0074
4. TITLE (and Subtitle) Physiological and Hygienic Characteristics of Working Conditions for Steel Smelters in Open Hearth Processes (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Belitskaia EN		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: Med Instit, Dnepropetrovsk		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 3P 9R
14. PUBLICATION Gig trud (USSR) 1981 (5);9-11		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In an occupational study (with limited data presented), workers (47, ages 21-50 yrs, were exposed 1-30 yrs to environments in open hearth steel smelting. Specific stresses encountered in combination include: SOUND (noise to 97 dbA), HEAT with high relative humidity, DUST approx 25 mg/m <sup>3</sup> , METALS and their oxides, including Mn, Cr, V, Mo, and GASES, including CO and CO <sub>2</sub> . Measurements were made of blood pressure, pulse rate, muscle strength, physical endurance, oculomotor reflexes, attention, etc. It was indicated, without detailed explanation, that occupational exposure to these factors degraded working ability.		
17. KEY WORDS smelting, heat, dust, metals, combined stresses, manganese, chromium, vanadium, molybdenum, gases, carbon monoxide, carbon dioxide, work performance, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0011
4. TITLE (and Subtitle) Biochemical and Cellular Effects of Welding Fume Particles in the Rat Lung		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) White LR, Hunt J, Tetley TD, Richards RJ		8. CONTRACT OR GRANT NUMBER(s) G: Govt of Norway
9. PERFORMING ORGANIZATION NAME AND ADDRESS NORWAY: Univ Trondheim Instit Biophys WALES: Univ College Cardiff, Dept Biochem		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 8P 20R
14. PUBLICATION Ann Occup Hyg 1981 (1);24:93-101		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (160) were exposed to welding fumes. Materials from manual metal arcs (eg Ni, Cr, gas & oxide mixes); and from arcs with stainless steel flux coated electrodes (basic & rutile, & incl. Cr, Ni, Mn, Fe, Cu, SiO <sub>2</sub> , Ti, etc.) were collected on filters, yielding particles with sizes 90% 17 under 1.5 um, suspended in saline, and instilled intratracheally and IP at 1, 5, and 10 mg. Materials from the Manual Metal Arc caused changes in pulmonary surfactant and hydrolytic enzymes, and changes in lung wt/body wt. In cytotoxicity, stainless steel was more active than basic coatings or rutile, and TiO <sub>2</sub> caused 18 no wt change. SS inceased abnormal cells, surfactant, and changed lysosome level.		
19. KEY WORDS welding fumes, combined stresses, manual metal arc, toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0040
4. TITLE (and Subtitle) Study of Pulmonary Deposition, and the Elimination of Some Constituent Metals from Welding Fumes in Laboratory Animals		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Lam HP, Hewitt PJ, Hicks R		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS ENGLAND: Univ Bradford		8. CONTRACT OR GRANT NUMBER(s) G: SRC-BOC Ltd., UK
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Ann Occup Hyg 1978 (4);21:363-371		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 9P 24R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies, guinea pigs (250-350 g) or rats (M, SD, 200 g) were exposed to welding fumes. Materials from manual metal arcs or metal-inert gas welding (with stainless steel wire) included various conc of Fe, Co, Ni, Zn, Sb, Cr, with particle sizes 0.06-0.1 um. These particles were inhaled for 46 or 256 min. fume conc av 1178 mg/m <sup>3</sup> . Analysis was made at various times after exposure of deposition of particulates in lungs, and the rate of metallic component removal from lung tissue. This rate of elimination appears to depend on solubility of the specific metal. Particles were also radiolabeled for lymph clearance studies. No combined effects were evident.		
19. KEY WORDS welding fumes, combined stress, arc welding, gas welding, lung pathology, chromium, cobalt, iron, nickel, zinc, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0119
4. TITLE (and Subtitle) Worker Exposure to Chemical Agents in the Manufacture of Rubber Tires and Tubes: Particulates		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Williams TM, Harris RL, Arp EW, Symons MJ, Van Ert MD		8. CONTRACT OR GRANT NUMBER(s) G: industry-union consortium
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ NC Schl Pub Hlth, Occup Hlth Studies Group, Chapel Hill		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 8P 11R
14. PUBLICATION Am Ind Hyg Assoc J 1980 (Mar);41:204-211		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In occupational studies on rubber workers in 14 tire plants, exposure to particulates such as CARBON BLACK, SULFUR, TALC, MICA, SOAPSTONE, RUBBER FUMES, ZINC STEARATE, ANTIOXIDANTS, OIL DROPLETS, ACCELERATORS, etc. were considered. Analyses of exposures included work with 12 occupational classes, consideration of specific processes and their related environments (eg in compounding, milling, mixing, curing, finishing, calendaring, extrusion), and the collection of material with area samplers, and respirable-material personal samplers. There was special interest in any fluxes of benzo-a-pyrene and capture by particulates. Exposure levels further depended on ventilation and work practices. Measurements were made of work-related illness and mortality. Methods of control of environment are discussed.		
17. KEY WORDS particulates, combined stresses, rubber workers, toxicity, carbon black, antioxidants, sulfur, talc, mica, soapstone, rubber fumes, zinc stearate, accelerators, milling, plant processes, work-related illness, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0146
4. TITLE (and Subtitle) Magnesium Oxide as Carrier Dust in Benzo-(a)pyrene-Induced Lung Carcinogenesis in Syrian Hamsters		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Stenback F, Sellakumar A, Shubik P		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Nebraska Med Ctr, Eppley Instit for Cancer Res, Omaha		8. CONTRACT OR GRANT NUMBER(s) C: PH-43-68-959
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION J Natl Cancer Inst 1975 (Apr);54:861-865		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 5P 34R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, hamsters (M, F, Syrian) were exposed to; BENZO(A)PYRENE at 2 Or 3 mg; together with either MAGNESIUM OXIDE at 1 mg or IRON OXIDE at 3 mg, BAP+MgO or IO were instilled intratracheally as fine mixed particles. BAP + MgO caused changes in squamous cell carcinomas in larynx, (with latent periods as short as 9 wks) also tracheal adenocarcinomas and bronchial lesions enhanced. MgO enhanced the tumor inducing effects of BAP; Fe <sub>2</sub> O <sub>3</sub> was equally effective, but acts more on lower bronchial tree. Both Fe <sub>2</sub> O <sub>3</sub> and MgO were effective as carriers. The action of the carrier agent does not depend on physical or chemical properties of the dust, which affects not only absorption and retention, but pulmonary defense mechanisms, mucus secretion, cilia function.		
19. KEY WORDS benzo(a)pyrene, magnesium oxide, iron oxide, combined stresses, carcinogenesis, lung pathology, laryngeal neoplasms, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0358
4. TITLE (and Subtitle) Synergistic Effects of Aerosols. Particulates as Carriers of Toxic Vapors		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) LaBelle CW, Long JE, Christofano EE		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Army Chem Ctr, Edgewood MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1955
		13. NUMBER OF PAGES AND REFS 8P 27R
14. PUBLICATION AMA Arch Industr Hlth 1955;11:297-304		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments mice (albino) were exposed to FORMALDEHYDE, or NITRIC ACID FUMES, OR ACROLEIN (doses not avail) as inhalation irritants; together with AEROSOLS (incl. glycerin, triethylene glycol, ethylene glycol, mineral oil, dicallite, celite, NaCl, attapulugus clay, santocel, etc)by inhalation. 17. Formaldehyde is an irritant to the upper respiratory passages, and acrolein is irritant to upper and lower tree. Aerosols increased toxicity of formaldehyde but had no effect on toxicity of nitric acid fumes. Data are provided showing changes in survival times when aerosols are added. The interactions depended on 18. the relative penetration of particles and vapor molecules.		
19. KEY WORDS aerosols, irritants, combined stresses, formaldehyde, acrolein, nitric acid, toxicity, pulmonary pathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0176
4. TITLE (and Subtitle) Asbestos Exposure, Smoking, and Neoplasia		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Selikoff IJ, Hammond EC, Churg J		8. CONTRACT OR GRANT NUMBER(s) G: NYC Hlth Res Council
9. PERFORMING ORGANIZATION NAME AND ADDRESS Mt Sinai Hosp Dept Community Med NY NY		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1968
		13. NUMBER OF PAGES AND REFS 7P 14R
14. PUBLICATION JAMA 1968 (2);204:104-110		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In occupational observations on asbestos insulation workers (approx 370) with data from 1922-present obtained for Newark and NYC experience, from records on members of Intl Assn of Heat & Frost Insulators and Asbestos Workers (union), analyses were made of mortality. These workers have a risk 7-8x the unexposed of dying from bronchogenic carcinoma (BC). Asbestos workers who smoked had 92X the risk of dying from BC compared with non-smoker non-workers. Mesothelioma risks were 10x the non-exposed. "Light" exposure is fallacious, autopsies world-wide have shown asbestos bodies in 25-50% of such groups.		
19. KEY WORDS asbestos, smoking, combined stresses, neoplasia, epidemiology, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0350
4. TITLE (and Subtitle) A Health Survey of Granite Workers in Finland ***		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Ahlman K, Backman AL, Partanen T		8. CONTRACT OR GRANT NUMBER(s) G: Finland Social Insur Institn
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Instit Occ Hlth, Helsinki		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 8P 9R
14. PUBLICATION Scand J Work Environ Hlth 1975;1:109-116		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In occupational observations, workers (1037, av age 36.5 yr) in 71 granite plants, were exposed to a variety of stressors associated with the specific process: refining (shaping, cutting, dressing with dust, noise, vibration, in 1 yr exposures); loading; crushing and grinding (sand, dust, noise); quarrying; drilling; transportation, dressing with pneumatic & other hammers (with dust, noise, vibration, flying fragments); sawing; smoothing/polishing; and sandblasting. From these the composition and levels of exposures were estimated. Health indicators included: subjective, chest x-ray (for tuberculosis, silica, fibrosis, tumors); audiometry; respiratory function; neurology. Present work methods in this industry increase risk of respiratory illness, hearing loss, vibration disease. Highest risks are :drill, dress, refine, sandblast. X-rays show highest fibrosis in dressing, sandblasting, drilling. Other discussions of vibration syndrome and silicosis are found.		
19. KEY WORDS granite work, silica, dust, combined stresses, toxicity, respiratory pathology, vibration syndrome, hearing loss, fibrosis, interactive responses		
20. NOTES *** Title Continues: "...Radiographic Findings, Respiratory Function, Hearing, Electric Sensory Thresholds of the Fingers, and Subjective Symptoms"		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0036
4. TITLE (and Subtitle) Effects of Inhaled Diesel Emissions and Coal Dust in Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Karagianes MT, Palmer RF, Busch RH		8. CONTRACT OR GRANT NUMBER(s) C: DE AC06-76RLO-1830
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 10P 21R
14. PUBLICATION Am Indust Hyg <sup>Assn</sup> J 1981 (5);42:382-391		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (M Wistar, pathogen-free) were exposed to: COAL DUST at approx 6-15 mg/m <sup>3</sup> (incl 2-6 mg/m <sup>3</sup> soot) also DIESEL EXHAUST from engine operated in 2 different modes, at 8.3 mg/m <sup>3</sup> (incl 2 mg/m <sup>3</sup> soot); given singly or in combination for 20 mos. Measurements were made of body wt, COHb, with other 17 observations of lung pathology, hematology, mortality. There were exposure-related lesions from these stressors, resembling coal workers pneumoconiosis,, but no changes in weight, mortality, or blood, except COHb which rose.		
18.		
19. KEY WORDS diesel exhaust, coal dust, combined stresses, lung pathology, pneumoconiosis, interactive responses		
20. NOTES		

PARTICLES  
COMBINED STRESS EXTRACTS

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0232
4. TITLE (and Subtitle) Synergistic and Interactive Effects (of Polynuclear Hydrocarbons) **		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Lee SD, Grant L (Eds)		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS EPA Envir Criter & Assess Ofc, Res Tri Pk; Syracuse Ctr for Chem Hazard Assesst, NY		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 6P 28R
14. PUBLICATION J Envir Path Toxicol 1981 (1);5:270-275		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT A variety of effects, and examples of specific substance actions discussed include: modulation of polynuclear hydrocarbon (PNH) action especially in tumor induction, by diet, enzyme-altering agents, dosage vehicles. A spectrum of PHC (aromatics) from auto exhaust (including non-carcinogens influencing tumor induction) is given. Tumor accelerating substances in cigarette smoke are considered. The pronounced cocarcinogenic effects of catechols and non-carcinogens, and data showing inhibiting effects of 9 hydrocarbons found in urban air are presented. It is stated that most naphthalenes in cigarette smoke have inhibitory effects on skin tumorigenicity by BaP (xc for several naphthalenes). Antioxidants as inhibitors of tumor induction with certain agents are also considered. The empirical complementarity of these various agents is discussed at length.		
19. KEY WORDS polycyclic hydrocarbons, auto exhaust, cigarette smoke, combined stresses, carcinogenesis, benzo(a)pyrene, dibenzanthracene, naphthalenes, antioxidants, cocarcinogenesis, interactive responses		
20. NOTES ** This is one chapter from the Proceedings of a Symposium on Health and Ecological Assessment of Polynuclear Hydrocarbons; published in this journal issue (365 pp, 540 refs)		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0178
4. TITLE (and Subtitle) Absence of Synergism between Exposure to Asbestos and Cigarette Smoking in Asbestosis		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Samet JM, Epler GR, Gaensler EA, Rosner B		8. CONTRACT OR GRANT NUMBER(s) G: NIH HL-T5998, R19717 CA-1173 C: PHS 1-HR-6-3028
9. PERFORMING ORGANIZATION NAME AND ADDRESS Boston Univ Schl Med, Depts Med & Surg MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 8P 22R
14. PUBLICATION Am Rev Respir Dis 1979 (July);120:75-82		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT Occupational exposure and clinical data were obtained on 4 groups of workers in different plants, including two shipyards. (Total pool was about 400, ages 41-45 yrs). Questionnaire sought data on respiratory symptoms, cough, sputum, and job history, and pulmonary function, physical exam, and chest x-rays were done. 17 Exposures were to ASBESTOS (in pipe covering and filter work) (data not available) and CIGARETTE SMOKING. Exposure to the A ranged 3.4-11.6 yr. The incidence of lung cancer in A + S workers was far greater than expected for smoking alone, but the synergistic role in fibrosis development itself has not been established. Synergism between the A and S exposures is not present for manifestations of asbestosis (fibrosis).		
19. KEY WORDS asbestos, smoking, combined stresses, shipyards, pulmonary pathology, fibrosis, lung cancer, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0180
4. TITLE (and Subtitle) Dust Exposure and Mortality in Chrysotile Mining, 1910-1975		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) McDonald JC, Liddell FD, Gibbs GW, Eyssen GE, McDonald AD		8. CONTRACT OR GRANT NUMBER(s) G: Quebec Asbestos Min- ing Assn.
9. PERFORMING ORGANIZATION NAME AND ADDRESS ENGLAND: Lond Schl Hyg Trop Publ Hlth; CANADA: McGill Univ Fac Med Dept Epidem & Publ Hlth Montreal		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 14P 25R
14. PUBLICATION Brit J Indust Med 1980;37:11-24		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT Occupational and clinical studies were made on workers(10,900 M, 500 F) who worked more than 1 mo in the mines and mills of As- bestos and Thetford, Quebec; during 1910-1975. Data sources in- cluded a 1966 register of 30,000 (nearly everyone) ever employed in the chrysotile industry; the ICD was used, and dust concen- trations were estimated and summed up. Smoking exposure was also queried and estimated. Of this sample, in 1875 4460 M and 84F had died. Trends in total mortality, lung cancer, pneumoconiosis were set down as functions of exposure and were linear for the latter 2. Excess mortality was 10% at Thetford and 2% at Asbestos Quebec, under conditions of study, and were worst if workers were employed over 20 yrs.		
19. KEY WORDS dust, asbestos, smoking, combined stresses, chrysotile mining, pneumoconiosis, lung cancer, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0104
4. TITLE (and Subtitle) Effect of Hot Microclimate on Development of Pneumoconiosis (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Zinger FH, Sukhanov VV, Sorokin IS, Zemliakova LF		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: Instit Hyg, Donetsk		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 3P 5R
14. PUBLICATION Vrach delo (USSR) 1978 (1);125-127		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies rate were exposed to COAL DUST at 20 mg intratracheal; also HEAT at 35° C and 85-90% RH 4 hr/day, 5x/wk. In one treatment, CD + H were applied for 8 hrs. Heat enhanced the formation of collagen in CD + H (measured by oxyproline content in the lung). HEAT inhibited pulmonary fibrosis during the first 4 hr of experiment (a period of adaptation) and the enhanced development of fibrosis during the late stages of exposure. In other studies of Donbass coal miners (deep and shallow) exposed for 15 yrs, the incidence of pneumoconiosis was higher in the deep mine with higher temperatures, than in the shallow mines.		
19. KEY WORDS dust, heat, combined stresses, coal mines, pulmonary fibrosis, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0168
4. TITLE (and Subtitle) Prevalence of Bronchitis and Airway Obstruction in American Bituminous Coal Miners		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Kibelstis JA, Morgan EJ, Reger R, Lapp NL Seaton A, Morgan WK		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIOSH Appalachian Lab Occup Resp Dis Morgantown WV		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 8P 16R
14. PUBLICATION Am Rev Respir Dis 1973;108:886-893		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In an occupational study in workers in 32 bituminous coal mines (anthracite not included), with emphasis on dust exposure with two particle size clusters (0.5-5.0 um, which is involved in pneumoconiosis, and 6-15 um) other data assembled included physical exam findings, chest radiographs, pulmonary function, and response to questionnaire. The prevalence of bronchitis (with cough, phlegm) was higher in smoking miners than among non/ex smokers. Surface workers showed less bronchitis. Airway obstruction was higher among those from work at coal face, compared with surface work. The effect of smoking was 5x that for coal dust.		
17. KEY WORDS coal mining, dust, smoking, combined stresses, epidemiology, pneumoconiosis, interactive responses		
18. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0171
4. TITLE (and Subtitle) Chronic Bronchitis in Miners and Non-miners: an Epidemiological Survey of a Community in the Gold-Mining Area in the Transvaal		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Sluis-Cremer GK, Walters LG, Sichel HS		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS S AFRICA: CSIR Pneumoconiosis Unit Johannesburg		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1967
		13. NUMBER OF PAGES AND REFS 12P 25R
14. PUBLICATION Brit J Indust Med 1967;24:1-12		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In an occupational study in a community where most subjects had underground mine service, the segment sampled were given simple questionnaires about their mining experience, smoking, incidence of chronic bronchitis (and such other information as personal and family history, allergy, any chest symptoms, etc). 17 Smoking and exposure to underground air pollution produced a synergistic xs prevalence of chronic bronchitis. This higher response in the dust-exposed is augmented with smoking to act more rapidly and completely on susceptible sections of the community. Dust inhalation was not the sole and direct cause of differences 18 in chronic bronchitis (miners who have never smoked have no excess rate for chronic bronchitis. Air pollution needs a cofactor (smoking) to cause serious disease and disability.		
19. KEY WORDS gold-mining, smoking, combined stresses, dust, air pollution, lung pathology, toxicity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0170
4. TITLE (and Subtitle) Mining, Lung Cancer, and Smoking		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Axelson O, Sundell L		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS SWEDEN: Linkoping Hosp Dept Occ Med		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 7P 20R
14. PUBLICATION Scand J Work Envir Health 1978;4:46-52		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In an occupational survey of ZINC and LEAD miners, vital statistics were obtained in Zn-Pb mining towns. In the case-referent study, including 29 subjects who died of lung cancer. 21/29 had been exposed to this underground mining. SMOKING habits data were also gathered. The incidence rate for lung cancer among miners is 16X non-miner rate. Non-smokers may be more apt to develop lung cancer than smokers among these miners. The radon daughters include alpha emitters, whose dose to potential tumor cells depends on their penetration; this is influenced by thickness of the mucus sheath eg in lung tissue. In smokers, this sheath will be thicker, and could cut dose by 50%. But in smoker-miners who get cancer, the induction-latency period is much shorter; and smoking may have a promoter effect after radiogenic induction.		
19. KEY WORDS mining, smoking, combined stresses, lead, zinc, radon daughters, alpha radiation, bronchitis, lung cancer, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0169
4. TITLE (and Subtitle) Uranium Mining and Cigarette Smoking Effects on Man		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Archer VE, Wagoner JK, Lundin FE Jr		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIOSH at Salt Lake City UT & Cincinnati OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 8P 31R
14. PUBLICATION  J Occup Med 1973 (3);15:204-211		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT <p>In an occupational survey of uranium miners in selected areas, and considering exposures which alter pulmonary function (silica dust, radiation, aging, cigarette smoke, and which are concurrently operative during career exposure; there was highlighted in this study the RADON DAUGHTER exposure. This was calculated by correlating RD measurement in the mines (cumulated as "Working Level Months") of intensity and duration, with data from death certificates (and autopsy and histology) also using modified life tables. Smoking is viewed by some as a promoter in the development of cancer induced by other agents, also acting to reduce the length of latent period to onset. Here, smoking was seen to contribute to lost ventilation function in U miners. Respiratory cancer rates in U miners (S and non S) was 6-9X that for non-miners (with similar smoking habits). The principal Ca agent is radiation; S is then a cofactor or promoter, not synergistic.</p>		
19. KEY WORDS <p>uranium mining, smoking, combined stresses, radon daughters, silica dust, cancer promoters, pulmonary pathology, interactive responses</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0136
4. TITLE (and Subtitle)  Carcinogenic Effects of Radon Daughters, Uranium Ore Dust, and Cigarette Smoke in Beagle Dogs		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Cross FT, Palmer RF, Filipy RE, Dagle GE, Stuart BO		8. CONTRACT OR GRANT NUMBER(s) C:AEC & ERDA AT45-1-1830 C: NIH EY-76-C-06-1830 C: ES-TD-212
9. PERFORMING ORGANIZATION NAME AND ADDRESS Battelle Pacific NW Lab, Richland WA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 20P 33R
14. PUBLICATION  Health Physics 1982 (Jan);42:33-52		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory studies dogs (M & F, ages 2-2.5 yr, beagles) were exposed to: RADON DAUGHTERS at 105 nCi/L + URANIUM (carnotite ore dust) at 12.9 mg/m <sup>3</sup> ; also CIGARETTE SMOKING via mask, at 10 cig/16 hr day, over 4.5 yr. In general, smoking has a mitigating effect on RD induced respiratory tract cancer in dogs. 17 Emphysematic fibrosis was more prevalent and severe in mixed exposure. There was no apparent effect here of RD &/or smoking on life-shortening.  18.		
19. KEY WORDS smoking, radon daughters, combined stresses, uranium dust, respiratory tumors, lung fibrosis, interactive responses.		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0128
4. TITLE (and Subtitle)  Cigarette Smoking and Exposure to Occupational Hazard		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Friedman GD, Siegelau AB, Seltzer CC		8. CONTRACT OR GRANT NUMBER(s) G: PHS HS-288 G: Kaiser Fdtn Res Inst G: Counc for Tobac Res
9. PERFORMING ORGANIZATION NAME AND ADDRESS Permanente Med Group, Dept Med Method Res, Oakland CA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 9P 9R
14. PUBLICATION  Am J Epidemiol 1973 (3);98:175-183		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In a survey associated with this group's programs in multiphasic health screening, subjects (about 70,000, 15-79 yrs) were queried on their present and past occupational exposures to chemicals, fumes, sprays, dusts, radiation, heat, noise, and various hazards encountered separately or together; with any available information of the frequency and extent of exposure. Smoking history was also recorded. Smokers were more apt than non-S to report previous and recent occupational exposures to chemicals, solvents, cleaners; NH <sub>3</sub> , Cl <sub>2</sub> , O <sub>3</sub> , NO <sub>x</sub> ; engine exhaust; plastic/resin fumes; metal fumes and sprays; asbestos and cement grains; silica and rock dust. There was no difference in frequency of reporting exposures between S/non-S for insect and plant sprays or ionizing radiation.		
17. KEY WORDS smoking, occupational hazards, combined stresses, toxicity, dust, noise, radiation, heat, toxic chemicals, tracheobronchial irritation, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0281
4. TITLE (and Subtitle) Simultaneous Exposures of Chinese Hamsters to Ethanol and Cigarette Smoke: Cytogenetic Aspects		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Korte A, Wagner HM, Obe G		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS W GERMANY (FR) Pettenkofer Instit, Toxic Div, Berlin		8. CONTRACT OR GRANT NUMBER(s) G: Min of Hlth
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Toxicol 1981 (2-3);20:237-246		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 10P 19R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments hamsters (59, Chinese, ages 10-20 wks) were exposed to controlled SMOKING (S) with Borgwald smoking machine, which uses 5 at a time, and uses 30 cigarettes/hr, with smoke diluted to desired CO levels using CO monitor to levels of 330-440 ppm. Smoke exposure was for 1 hr/day. ETHANOL at 10% (other data unavail) was given during wk 1, at 15% during wks 2 & 3, and 20% for rest of 12 wks. Various treatments with E + CS were used. After 12 wks, bone marrow cell studies showed no chromosome aberrations, or sister chromatid exchanges, or chromatid breaks or translocations. However, there was seen high mitotic activity in smoke-treated animals.		
19. KEY WORDS ethanol, cigarette smoking, combined stress, cytogenetics, chromosome aberrations, sister chromatid exchanges, mitotic activity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0181
4. TITLE (and Subtitle)  The Combined Effects of Smoking and Occupational or Urban Factors in Relation to Lung Cancer.		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Waller RE		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  ENGLAND: St. Bartholomew's Hosp Med Coll MRC Air Pollut Unit, London		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1972
		13. NUMBER OF PAGES AND REFS 6P 19R
14. PUBLICATION  Ann Occup Hyg 1972;15:67-73		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT Occupational epidemiological studies here considered exposures in various OCCUPATIONS: Uranium, Nickel, or Gas working: to EXTERNAL ENVIRONMENTS comparing N.Wales, regarded as unpolluted, with Merseyside, considered polluted; and combined with SMOKING. The effect of combinations of these factors on lung cancer mortality was studied. In some occupational groups (U and Ni work), smoking enhances lung cancer risk. In general populations, the effect of smoking is large relative to other factors. There was no indication in this study of interaction between smoking and air pollution. Air pollution, either alone or with smoking is asserted to be a minor factors in the development of lung cancer.		
19. KEY WORDS occupational hazards, environmental pollution, smoking, combined stresses, uranium industry, nickel working, gasworking, lung cancer, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0182
4. TITLE (and Subtitle) Evidence of a Multiplicative Effect between Cigarette Smoking and Occupational Exposures in the Etiology of Bladder Cancer		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Vineis P, Segnan N, Cista G, Terracini B		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS ITALY: Univ Torino Cancer Epidemiol Unit		8. CONTRACT OR GRANT NUMBER(s) C: Ital NRC C: League agst Cancer C: Assn for Cancer Res
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Cancer Letters 1981 (3);14:285-290		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 5P 27R
		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT Case and control studies were made in Torino province, on 225 case-referent pairs, in OCCUPATIONS with excess risk for cancer, including dyestuffs manufacture, rubber & cable production, leatherwork, petroleum refining, textile industry, etc. CIGARETTE SMOKING exposure was also recorded (it was noted that 30 unfiltered cigarettes/day will expose to 3 mg of 2-naphthyl-amine in a 2 yr period. There was found a clear cut dose relation between smoking and risk of urinary tract cancer; at different smoking levels + one of the occupations, the risk form suggested a multiplicative effect, resembling the asbestos + cigarette smoke association with lung cancer.		
19. KEY WORDS smoking, occupational exposure, combined stresses, dyestuffs industry, leatherworking, textile mills, petroleum refining, furnace working, chemical industry, rubber & cable production, cancer, lung pathology, urology, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0227
4. TITLE (and Subtitle) The Interaction of Air Pollution, Occupation, and Cigarette Smoking as Risk Factors in Lung Cancer		5. TYPE OF REPORT & PERIOD COVERED Abstract
7. AUTHOR(s) Vena JE		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Roswell Park Memor Instit Buffalo NY		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 1P no R
14. PUBLICATION Am J Epidemiol 1981;109:441 (abstract)		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT This epidemiology presentation considers two groups: lung cancer patients (417 M) and referents (752 with non-respiratory, non-neoplastic diseases) as seen at RPMI. Exposure to PARTICULATES in air was estimated, using available Total Suspended Particulate data, and local histories of problem point sources. 17. SMOKING habits of the subjects were also recorded. When air pollution, occupation, and smoking are considered separately, smoking is the strongest individual risk factor, extending risk by 6X over non-smokers, for lung cancer. There was no support for the thesis that exposure to air pollution alone increased risk. Risks seemed 18. synergistic for: heavy smokers + heavy occupational exposure; heavy smokers + heavy air pollution; and smokers + occupational exposure + air pollution (aggregate risk factor 7X base, with "Rothman Index of Synergy" 2.16. Occupations were not discussed.		
19. KEY WORDS air pollution, smoking, combined stresses, lung cancer, particulates, occupational hazards, risk factors, synergy indices, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0163
4. TITLE (and Subtitle) An Industrial Study of the Biological Effects of Cotton Dust and Cigarette Smoke Exposure		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Merchant JA, Lumsden JC, Kilburn KH, O'Fallon WM, Ujda JR, Germino VH Jr, Hamilton JD		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Duke Univ Med Ctr, Durham, NC		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 10P 26R
14. PUBLICATION J Occup Med 1973 (3);15:212-221		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT Occupational and clinical observations were made on textile mill workers (846 M) exposed to COTTON DUST at 0.5-2.1 mg/m <sup>3</sup> "lint free", for up to 25 yrs. The exposures were sampled every 50 ft in breathing zones of workers, and were highest in preparation areas of these cotton blend mills. The second stressor considered 17 was SMOKING, classed as "never" (for at least the past 1 yr), or moderate (1-20 cigarettes/day used up to 1 mo before sampling), or heavy (more than 20/day). Cigarette smoking interacted with CD exposure to increase byssinosis prevalence and severity. Bys- 18 sinosis symptoms are classed as: Grade 0, no cough, but tightness in chest with breathing; Grade 1, tightness in chest and breath- ing difficulty; and Grade 3, these symptoms + other deterioration in pulmonary sufficiency (dyspnea, changed ventilating capacity). Cigarette smoking also increases the overriding bad effects of CD on 4 measures of ventilation capacity; bronchial clearance drop.		
19. KEY WORDS cotton dust, smoking, combined stresses, textile mill workers, byssinosis, pulmonary pathology, cigarettes, interactive responses.		
20. NOTES		

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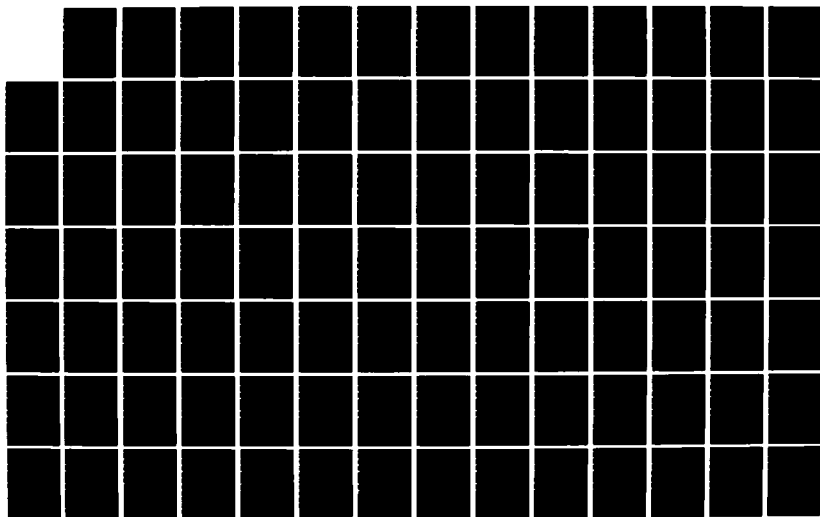
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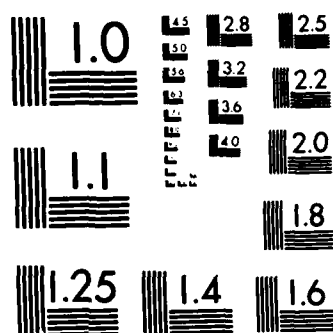
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GAS/VAPOR  
COMBINED STRESS EXTRACTS

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0061
4. TITLE (and Subtitle) Inhalation of Toxic Products from Fires		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Birky MM, Clarke FB		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Nat Bur of Stds, Ctr Fire Res Wash DC		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 17P 9R
14. PUBLICATION Bull NY Acad Med 1981 (Dec);57:997-1013		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT <p>This report was presented at a symposium on health effects of indoor air pollution. It discusses the principal sources of fire toxics (seating, bedding, etc), the initiation event (smoking, electrical fault, heating, flammables), the principal toxic components in everyday fire exposure (including HCN, CO), the levels found, and those necessary to incapacitate or kill; including the modulating effect of body alcohol levels. The pathology of fire toxic effects is considered, highlighting pulmonary edema and congestion, burns, soot deposits, raised COHb. Sources of heavy metals from paints and plastics, and of other toxics are considered. Interactive events are given attention.</p>		
19. KEY WORDS <p>fire toxics, combined stresses, hydrogen cyanide, carbon monoxide, carboxyhemoglobin, heavy metals, smoke, soot, burns, interactive responses</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0245
4. TITLE (and Subtitle) Health Effects of Coal Mining and Combustion: Carcinogens and Cofactors		5. TYPE OF REPORT & PERIOD COVERED Review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Falk HL, Jurgelski W Jr		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIEHS Res Triangle Pk NC		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 24P 98R
14. PUBLICATION Environ Hlth Perspect 1979 (12);33:203-206		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT Among the exposure factors discussed here are: polycyclic and heterocyclic compounds(present in soot and coal), free radicals from combustion, nitrosamines, some inorganic compounds containing As, Cd, Pb, Se. There is discussion of the ways in which actual synergy, cofactor operation, cocarcinogenesis may be obscured by the time-lags and extraneous factors entrained in these processes. The augmentation of inhalation toxicity by substance linkup with particulates is considered. There is a survey of the epidemiologic evidence of carcinogenic risks in mining, and an adversary discussion of the way in which lab studies support or contradict epidemiological data. Topics of prevention of exposure or reduction of hazard are discussed.		
19. KEY WORDS coal, polycyclic hydrocarbons, combined stresses, soot, metals, arsenic, cadmium, lead, selenium, nitrosamines, cocarcinogens, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0172
4. TITLE (and Subtitle)  Combined Action of Cigarette Tar and Beta Radiation on Mice		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Cowdry EV, Croninger A, Solaric S, Suntzeff V		8. CONTRACT OR GRANT NUMBER(s) G: Am Canc Soc G: NIH NCI
9. PERFORMING ORGANIZATION NAME AND ADDRESS Wash Univ Schl Med, Wernse Canc Res Lab St Louis MO		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1961
		13. NUMBER OF PAGES AND REFS 9P 16R
14. PUBLICATION  Cancer 1961;14:344-352		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
18. EXTRACT <p>In a laboratory study mice (400 F, age 2 mo) were exposed to: IONIZING BETA RADIATION from <sup>90</sup>Strontium medical applicator, at 86 R equiv Beta/sec at the surface (back of mouse), for total dose of 2,000 Rep(Dose drops to 1% at 5 mm skin depth). Exposure was for 2 sec, 2x/wk or 12 sec, 1/mo. They were also exposed to CIGARETTE TAR from an autosmoking machine. The nicotine fraction was removed, and the tarry residues, in acetone painted on shaved backs 3x/wk for 12 mo. Effect on epidermal carcinogenesis was additive, with no evidence of synergy; this radiation had very little carcinogen skin effect. In one group, 61% developed skin cancer from tar at 3x/wk and 200 Rep 3 x/wk. There are, in other experiments with X-rays and methylcholanthrene, additive and synergistic effects in development of leukemia in mice.</p>		
19. KEY WORDS cigarette tar, beta radiation, combined stresses, strontium-90, bronchogenic carcinoma, carcinogenesis, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0179
4. TITLE (and Subtitle) Synergism between Dust Exposure and Smoking: an Artefact in the Statistical Analysis of Lung Function		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Rossiter CE, Weill H		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS WALES: MRC Pneumoconios Unit, Llandough Hosp USA: Tulane Univ Schl Med Dept Med New Or		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Bull Physiopath Resp (Nancy) 1974;10:717-723		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 7P 4R
		15. SECURITY CLASS. (of this report)
16. EXTRACT In survey of exposures in asbestos and cement works to dust and other hazards, a variety of confounding factors are considered. There is difficulty in standardizing for age in regression graphs; for many indices smokers have worse lung function with age, changing non-linearly; eg FEV drops 10x faster in smokers vs nonsmokers. The report claims that using this measure, the age-smoking habits interaction entirely accounts for apparent synergism in smoking and dust exposure. Cigarette smokers + dust have worse lung function than non-smokers, and gap gets wider with increasing dust dose or duration of exposure.		15. DISTRIBUTION
19. KEY WORDS dust, cigarette smoking, combined stresses, pulmonary function, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0185
4. TITLE (and Subtitle) Carboxyhemoglobin Levels due to Traffic Exhaust		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) DeBruin A		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NETHERLANDS: Univ Amsterdam, Coronel Lab Occup Hyg		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1967
		13. NUMBER OF PAGES AND REFS 6P 13R
14. PUBLICATION Arch Environ Hlth 1967;15:384-389		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT <p>In occupational studies in Rotterdam and Amsterdam streets, these groups of human subjects were observed:</p> <p>traffic police, 36 non-smokers, exposed to exhaust for 1-4 hrs in Rotterdam; traffic police, 10 non smokers 4.5 hrs duty in Amsterdam; traffic police, 14 smokers in Amsterdam; drivers (cabs, vans) 7 hrs city driving, nonsmokers; cyclists, 13 and moped, 8 drivers; customs officers, 13, nonsmokers. In Rotterdam, COHb before work av 0.93%, then up to 1.1% after. In Amsterdam, levels rose from 1.43 to 1.74 in non-smokers, from 4.62-4.91 in smokers, for drivers from 1.9 to 2.15%, for cyclists no change, for customs officers a rise. These conditions were for 1967, and change year by year. COHb at 5% would cause early signs of intoxication, and would need exposure to 30 ppm CO. Tunnels go up to 100 ppm. Other factors: aldehydes, SO<sub>2</sub>, soot were not studied at this time.</p>		
19. KEY WORDS <p>carbon monoxide, vehicle exhaust, combined stresses, toxicity, motor traffic, air pollution, carboxyhemoglobin, interactive responses</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0280
4. TITLE (and Subtitle) Marked Lethality of Rats in Combined Exposure to Carbon Monoxide and Diethyldithiocarbamate		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Kurppa K		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Instit Occup Hlth Helsinki		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 4P 9R
14. PUBLICATION Res Commun Chem Path Pharmacol 1981 (July);33:179-182		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies rats (39) were exposed to: CARBON MONOXIDE up to 1000 ppm for 2.5 hr; also DIETHYLDITHIOCARBAMATE (DDC) at 0.5 g/Kg (a superoxide dismutase inhibitor, used in O <sub>2</sub> toxicity intervention, and well below LD <sub>50</sub> here). CO + DDC killed 16/23 rats. DDC had no such action. CO alone 17 reached an equilibrium conc with COHb of 60%. No other data given.		
18.		
19. KEY WORDS carbon monoxide, diethyldithiocarbamate, combined stress, toxicity, superoxide dismutase, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0123
4. TITLE (and Subtitle) Dichloromethane and Carbon Monoxide Inhalation: Carboxyhemoglobin Addition and Drug Metabolizing Enzymes in Rat		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Kurppa K, Kivisto H, Vainio H		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FINLAND: Instit Occ Hlth Helsinki		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 5P 23R
14. PUBLICATION  Intl Arch Occup Environ Hlth 1981 (1);49:83-87		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory studies rats (15M Wistar) were exposed to: CARBON MONOXIDE at 100 ppm; also DICHLOROMETHANE at 1000 ppm, in 3 hr exposure alone or in combination. Observations were made of kidney and liver microsomes, blood COHb, ethoxycoumarin-o-diethylase activity. Effects of combined exposure are additive, and COHb increases after this exposure. DCM yields CO in the body, to the blood, then equilibrating with alveolar air.		
17.		
18.		
19. KEY WORDS carbon monoxide, dichloromethane, combined stresses, toxicity, carboxyhemoglobin, liver enzymes, kidney enzymes, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0313
4. TITLE (and Subtitle) Effects of Diesel Exhaust		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Battigelli MC		8. CONTRACT OR GRANT NUMBER(s) G: PHS AP-33
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Pittsburgh Grad Schl Pub Hlth, Dept Occup Hlth PA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1965
		13. NUMBER OF PAGES AND REFS 3P noR
14. PUBLICATION Arch Environ Hlth 1965;10:165-167		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In this study of conditions encountered by locomotive repairmen, and other related shop and yard workers, volunteers were exposed to DIESEL EXHAUST for up to 1 hr, from 1 cylinder 4 cycle engine, with inhalation and face exposure. Composition of the exhaust was typically: NO <sub>2</sub> 1ppm, SO <sub>2</sub> 0.2ppm, CO under 20ppm, CO <sub>2</sub> 1000ppm, tot aldehydes under 1ppm, acrolein under 0.05ppm, formaldehyde under 0.1ppm. No effects were seen in measured pulmonary resistance (from esophageal pressure and flow) for exposures up to 1 hr. Modes of exposure were not stated.		
17.		
18.		
19. KEY WORDS diesel exhaust, combined stresses, nitrogen dioxide, sulfur dioxide, carbon monoxide, railroad workers, lung function, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0085
4. TITLE (and Subtitle) Contribution of Carbon Monoxide to the Toxicity of a Multicomponent Vapor-Gas Aerosol Mixture (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Kustov VV, Litau VG, Obukhova MF, Yukhnovsky GD, Zharov VV		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: Moscow (site not given)		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 3P 15R
14. PUBLICATION Gig trud (USSR) 1980 (2);26-28		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies rats (M albino) were exposed to: CARBON MONOXIDE; SULFUR ANHYDRIDE, NITROGEN DIOXIDE, AND AMMONIA (values not given), with doses of individual or mixed substances, in 5 min exposure. (This is in part, a simulation of the mixture of combustion products from a heated (T 850°C) synthetic grease). Five min exposure to a combustion product mix gives a greater toxic effect than CO exposure alone, in the same conc as in the mixture. All animals survived exposure to CO alone, compared with 25-30% lethality from the mix. Oxygen content did not affect toxicity of the combustion products.		
17. KEY WORDS carbon monoxide, combustion products, combined stresses, sulfur anhydride, nitrogen dioxide, ammonia, aerosols, toxicity, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0375
4. TITLE (and Subtitle) Method for Studying the Toxicity of Mix- tures of Gaseous Combustion Products of Lubricant Greases (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Kustov VV, Obukhova MF, Bugar KP, Burdasov EN, Yastrebov VE		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: site not given		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 2P 6R
14. PUBLICATION  Gig trud (USSR) 1981 (3);51-52		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies mice (M albino) were exposed to: NITROGEN DIOXIDE, AMMONIA, SULFUR COMPOUNDS and other volatile gaseous products of combustion of synthetic grease (heat up to 850° C in air) (values not given), in 5 min inhalation exposure. Lethality in 3 days and COHb content were observed. Discussion 17 follows on the toxicity of the components and of the mixtures, at different exposure rates.  18.		
19. KEY WORDS  combustion products, combined stresses, lubricant greases, volatiles, aerosols, toxicity, lung pathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0050
4. TITLE (and Subtitle) Combined Effects of Carbon Monoxide plus Sodium Nitrite or Carbon Tetrachloride on the Sciatic Motor Conduction Velocity of Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Pankow D, Ponsold W, Glatzel W, Tietze K		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS E GERMANY (DDR) Martin Luther Univ Instit Hyg Dept Indust Toxicol, Halle-Wittenberg		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 8P 22R
14. PUBLICATION Intl Arch Occup Hlth 1975;35:81-88		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
<p>16. EXTRACT</p> <p>In laboratory studies rats (M, albino) were exposed to: SODIUM NITRITE at 0.2-0.4 M/kg IP; also CARBON MONOXIDE at 1.2 mmol/kg sc; also CARBON TETRACHLORIDE at 8.3 mmol/kg po. These were given separately or in combination. NaNO<sub>2</sub> alone drops motor conduction velocity; associated with the formation of Methb. MCV change starts at 16.7 Methb, is distinct at 22%. CO drops MCV starting at COHb 30-50%, yielding MCV drops of 24% and 28%. CO and NaNO<sub>2</sub> have approx similar modes of action, shifting dissociation curve of O<sub>2</sub>-Hb to left. CCl<sub>4</sub> did show differing effects on impairment of nerves. There were no differences between CCl<sub>4</sub> + CO and CO alone. A single admin of NaNO<sub>2</sub> or CCl<sub>4</sub> has no influence on CO-induced changes of MCV. Additional toxic substances cannot exaggerate this effect. There are no apparent antagonistic or potentiating effects among NaNO<sub>2</sub>, CCl<sub>4</sub> and CO.</p>		
<p>19. KEY WORDS</p> <p>carbon monoxide, sodium nitrite, carbon tetrachloride, combined stresses, nerve conduction velocity, interactive responses</p>		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0371
4. TITLE (and Subtitle) Human Biochemical Response to Ozone and Vitamin E		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Posin CI, Clark KW, Jones MP, Buckley RD, Hackney JD		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Rancho Los Amigos Hosp, Envir Hlth Labs Downey CA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 10P 24R
14. PUBLICATION J Toxicol Environ Hlth 1979 (6);5:1049-1058		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies human subjects (28M, 28F, healthy students) were given VITAMIN E at 800 IU dl-alpha-tocopherol/day for 9-11 wks. They were then exposed to OZONE at 0.5 ppm fpr 140 min; and given intermittent exercise and tested for respiratory function, blood chemistry, and hematology. No interactive responses were observed; no changes due to combined stresses of O <sub>3</sub> and Vit E. Vitamin E did not provide any protection in these studies against O <sub>3</sub> .		
18.		
19. KEY WORDS ozone, vitamin E, combined stresses, toxicity, protective agents, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0332
4. TITLE (and Subtitle)  Experimental Studies on Human Health Effects of Air Pollutants. 1. Design Considerations		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Hackney JD, Linn WS, Buckley RD, Pedersen EE, Karuza SK, Law DC, Fischer DA		8. CONTRACT OR GRANT NUMBER(s) G: NIH HL-SCOR 15098 G: EPA R-801396 C: Cal Air Resources Bd
9. PERFORMING ORGANIZATION NAME AND ADDRESS Rancho Los Amigos Hosp Envir Hlth Labs Downey CA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 6P 29R
14. PUBLICATION  Arch Environ Hlth 1975 (Aug);30:373-378		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  This discusses methodology for studies which are reported in the citations noted below. They deal with human subjects exposed to lab simulations of smog pollutants and others, including OZONE, NITROGEN DIOXIDE, CARBON MONOXIDE, singly and in combination, in short 2 hr and 4 hr exposures. SULFUR DIOXIDE is also included. 17 The exposure chamber conditions discussed include the concentrations of the stressors used, chamber temperature conditions (from 15° F-130° F, and compares these with Los Angeles extreme ambient conditions. The specific clinical, biochemical, and behavioral evaluations which are done are also discussed. 18.		
19. KEY WORDS ozone, nitrogen dioxide, carbon monoxide, combined stresses, air pollution, pulmonary function, interactive responses		
20. NOTES Other parts of this study will be found in this journal volume on pp 379-384 and 385-390		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0029
4. TITLE (and Subtitle) Experimental Studies on Human Health Effects of Air Pollutants. 2. Four-Hour Exposure to Ozone Alone and in Combination with other Pollutant Gases		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Hackney JD, Linn WS, Mohler JG, Pedersen EE, Breisacher P, Russo A		8. CONTRACT OR GRANT NUMBER(s) G: NIH HL-SCOR 15098 G: EPA R-801396 G: Cal Air Resources Bd
9. PERFORMING ORGANIZATION NAME AND ADDRESS Rancho Los Amigos Hosp, Envir Hlth Labs, Downey CA.		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 6P 14R
14. PUBLICATION Arch Environ Hlth 1975 (Aug);30:379-384		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT  In laboratory studies human subjects (4M healthy, 4M with history of allergy from exposure to air pollutants-sensitive group) were exposed to: OZONE, at 0.5 ppm; also NITROGEN DIOXIDE at 0.3 ppm; also CARBON MONOXIDE at 30 ppm. Exposures were to separate agents, or to combinations with ozone preceding NO <sub>2</sub> or CO, given by inhalation 5 days/wk in 4 hour exposures, for 3 wks. Chambers were kept at 31° C and 35% RH. Treatments were week 1: O <sub>3</sub> at 0.5 ppm; week 2: O <sub>3</sub> at 0.5 + NO <sub>2</sub> at 0.3; week 3: O <sub>3</sub> at 0.5 ppm + NO <sub>2</sub> at 0.3 ppm + CO at 30 ppm. In the sensitive group, at 0.5 ppm O <sub>3</sub> there was reduced forced-vital-capacity (FVC) and increased airway resistance. There is shown a broad sensitivity to O <sub>3</sub> if there is pre-existing airway hyperreactivity. There was no drop in function in healthy controls at O <sub>3</sub> 0.5 ppm alone or with NO <sub>2</sub> at 0.3 ppm.		
17. KEY WORDS  ozone, nitrogen dioxide, carbon monoxide, combined stresses, pulmonary function, allergic sensitivity, interactive responses		
20. NOTES  Other parts of this study will be found in this same journal volume on pp 373-378. and 385-390		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0112
4. TITLE (and Subtitle) Experimental Studies on Human Health Effects of Air Pollutants. 3. Two-Hour Exposure to Ozone Alone and in Combination with other Pollutant Gases		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Hackney JD, Linn WS, Law DC, Karuza SK, Greenberg H, Buckley RD, Pedersen EE		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Rancho Los Amigos Hosp, Envir Hlth Labs, Downey CA		8. CONTRACT OR GRANT NUMBER(s) G: NIH HL-SCOR 15098 G: EPA R-801396 C: Cal Air Resources Bd
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Arch Environ Hlth 1975 (Aug);30:385-390		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 6P 8R
		15. SECURITY CLASS. (of this report)
16. EXTRACT In laboratory studies human subjects (13M ages 22-41 yrs) were exposed to: OZONE at 0.5 ppm for 1 wk; or in a 3 wk experiment, on wk 1 to O <sub>3</sub> at 0.25 ppm, on wk 2 to O <sub>3</sub> at 0.25 ppm + NO <sub>2</sub> at 0.30 ppm, on wk 3 to O <sub>3</sub> at 0.25 ppm + NO <sub>2</sub> at 0.3 ppm + CO at 30 ppm; in another group, exposure was to O <sub>3</sub> at 0.37 ppm for 1 wk. 17 Normal healthy subjects and those sensitives, reactive allergically to pollutant exposures, were stressed as above and also in some studies exposed to heat, intermittent exercise. Exposures to O <sub>3</sub> at 0.5 ppm dropped forced vital capacity, forced expiratory vol, and respiratory flow rates. O <sub>3</sub> .25ppm caused no real changes, even 18 with NO <sub>2</sub> 0.3 ppm and CO 30 ppm together. O <sub>3</sub> at .37ppm causes small drop in lung functions; more substantial at 0.5 ppm. Reactive subjects showed drop in FVC and FEV on successive days.		15a DISTRIBUTION
19. KEY WORDS ozone, nitrogen dioxide, carbon monoxide, combined stresses, pulmonary function, allergic sensitivity, interactive responses		
20. NOTES Other parts of this study will be found in this same journal volume on pp 373-378, and 379-384		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0368
4. TITLE (and Subtitle) Protective Effects of Dietary Alpha-Tocopherol in Rats Exposed to Toxic Levels of Ozone and Nitrogen Dioxide		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Fletcher BL, Tappel AL		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-P628 AN-R9933 G: Cal Air Resources Bd
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cal Dept Food Sci & Technol Davis		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 9P 18R
14. PUBLICATION Environ Res 1973;6:165-173		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies rats were exposed to ALPHA-TOCOPHEROL at 10.5, 45, 150, 315 mg/kg of body wt ; also OZONE at 0.7-16. ppm or NITROGEN DIOXIDE at 20-25 ppm. In the treatments with single and combined stressors, various diets with A-T deficiency or A-T added, or DL-methionine, or BHT added, were given for 4 wks before ozone or NO <sub>2</sub> . A-T protects against lipid peroxidation in lung as a reciprocal function of the log of dietary A-T. A-T extends survival of rats exposed to toxic levels of O <sub>3</sub> and NO <sub>2</sub> . Highest survival rates are at highest A-T, (also shown with ascorbic acid and methionine. At O <sub>3</sub> 0.6 ppm 4 hrs (LC <sub>50</sub> ) A-T prolongs life. At O <sub>3</sub> 0.8 ppm (like Los Angeles smog) continuous exposure is lethal, not altered by A-T. Lung lipid peroxidation provides the best measure of survival capability.		
19. KEY WORDS alpha-tocopherol, ozone, nitrogen dioxide, combined stresses, alkane metabolism, lipid peroxidation, smog, antioxidants, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0285
4. TITLE (and Subtitle) Effect of Vitamin E and Ozone on Pentane and Ethane Expired by Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Dumelin EE, Dillard CJ, Tappel AL		8. CONTRACT OR GRANT NUMBER(s) G: NIH AM-9933 G: ES-P628 G: EPA
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cal Dept Food Sci & Tech, Davis		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 6P 28R
14. PUBLICATION Arch Environ Hlth 1978 (5-6);33:129-134		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments rats (M, SD, age 21 days) were prepared with several diets (Group 1 fed a Vitamin E deficient diet; Group 2 fed V-E at 11 IU/kg in diet; and Group 3 fed V-E at 40 IU in diet. Feeding is halted 18-22 hr before breathing samples are collected. They are exposed in one variant to 8 wks of a V-E deficient diet, with supplemental V-E of 0,11,40 IU; then exposed to OZONE at 1 ppm for 60 min, and pentane and ethane measured in expired air. After O <sub>3</sub> exposure, pentane increases only in V-E deficiency.		
17. KEY WORDS vitamin E, ozone, combined stresses, pentane, ethane, alkane metabolism, lipid peroxidation, lipid peroxidation, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0134
4. TITLE (and Subtitle) Effects of Exercise, Vitamin E, and Ozone on Pulmonary Function and Lipid Peroxidation		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Dillard C , Litov RE, Savin WM, Dumelin EE, Tappel AL		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cal Dept Food Sci & Tech, Davis		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-P628 G: AFOSR 77-3153 support G: Hoffman LaRoche
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION J Appl Physiol 1978 (6);45:927-932		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 6P 30R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies human subjects (5M, 5F, ages 20-28 yr) were exposed to: OZONE at 0.3 ppm; EXERCISE to reach & hold 50% VO <sub>2</sub> max for 1 hr; and ALPHA-TOCOPHEROL at 1200 IU in diet daily for 2 wk. Exercise alone induced lipid peroxidation and expired pentane rise. O <sub>3</sub> at 0.3 ppm does not change pentane out, beyond the exercise yield. O <sub>3</sub> at 1.0 ppm increases pentane only if there is an A-T deficiency. After A-T is replaced, pentane output goes down.		
18.		
19. KEY WORDS ozone, vitamin E, combined stresses, exercise, pulmonary function, lipid peroxidation, alkane metabolism, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0339
4. TITLE (and Subtitle)  Ozone Hazards Incurred in Gamma Plant Operation		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Nieto JA, Salvi RP, Gutierrez C		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS MEXICO: Natl Instit Nuclear Study, Mexico City		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 5P 17R
14. PUBLICATION  Health Phys 1982 (6);42:861-865		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  Irradiation of eg air in these plants creates OZONE, NITROGEN DIOXIDE, NITRIC OXIDE, NITROUS OXIDE, NITROGEN PENTOXIDE, etc. O <sub>3</sub> may be the most toxic of these in the internal environment of the facility. The report discusses present accepted limits for O <sub>3</sub> exposure; discusses some quantitative aspects of O <sub>3</sub> production, shows calculation of conc buildup, and states some ventilation requirements. All of these assume a <sup>60</sup> Co source in the plant.		
17.		
18.		
19. KEY WORDS ozone, gamma radiation, combined stresses, nitrogen oxides, radiocobalt, nuclear reactor, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0034
4. TITLE (and Subtitle) Effect of Exposure to 0.5 ppm HCN Singly or Combined with 200 ppm CO and/or 5 ppm NO on Coronary Arteries, Aorta, Pulmonary Artery, and Lungs in Rabbir		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Hugod C		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS DENMARK: Rigshosp Dept Clin Chem Copenhagen		8. CONTRACT OR GRANT NUMBER(s) G: Hamburg Res Group for Smoking & Hlth
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  Intl Arch Occup Environ Hlth 1979;44:13-23		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 11P 15R
		15. SECURITY CLASS. (of this report)
16. EXTRACT  In laboratory studies rabbits (160 albino) were exposed to: HYDROGEN CYANIDE, range 0.28-0.94 ppm (av 0.5 ppm); CARBON MONOXIDE, range 170-580 ppm (av 200 ppm); NITRIC OXIDE, range 2.5-5.3 ppm (av 5 ppm); and NITROGEN DIOXIDE, range 0.04-0.1 ppm. These are gaseous constituents of tobacco smoke, eg smoking 3-6 hr exposes to 0.5 ppm HCN. Study showed that: HCN alone, 0.5 ppm for 1 or 4 wks ; or HCN (0.5) + CO (200) for 1 or 4 wks; or HCN (0.5) + CO (200) + NO (5) for 2 wks had no effect on the morphology of the aortal intimal vasculature, or coronary arteries, or pulmonary arteries. NO at 5 ppm for 2 wks caused minor changes in morphology of lungs, endothelium of pulmonary and coronary arteries, and aorta.		18. DISTRIBUTION
19. KEY WORDS hydrogen cyanide, carbon monoxide, nitric oxide, combined stresses, pulmonary pathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0323
4. TITLE (and Subtitle) Effect of Exposure to 43 PPM Nitric Oxide and 3.6 PPM Nitrogen Dioxide on Rabbit Lung		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Hugod C		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS DENMARK: Rigshospital, Dept Clin Chem Copenhagen		8. CONTRACT OR GRANT NUMBER(s) C:Cmsn Eur Cmnties: 031-74-1 ENV DK
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Int Arch Occup & Environ Hlth 1979;42:159-167		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 9P 12R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies rabbits (12 M) were exposed to NITRIC OXIDE at 43 ppm; also NITROGEN DIOXIDE at 3.6 ppm in air for 6 days. No changes in pulmonary morphology or lung function were seen. The report discusses species differences in responses and greater susceptibilities of smaller rodents to air pollutant toxins.		
17.		
18.		
19. KEY WORDS nitric oxide, nitrogen dioxide, combined stresses, toxicity, pulmonary function, smoking, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0089
4. TITLE (and Subtitle) Effect of Ammonia and Nitrogen Dioxide on Respiratory Microbial Infections (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Mikhailuts AP, Poponnikov VA, Golubev IV, Lambina SA		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: Med Instit, Kemerov		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 4P 12R
14. PUBLICATION  Gig trud (USSR) 1979 (8);8-11		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory studies, rats (albino) were exposed to: AMMONIA, at 3 and 6 mg/M <sup>3</sup> ; also NITROGEN DIOXIDE, at 0.5 and 1.5 mg/M <sup>3</sup> . (each conc was about 30% of the max permissible conc in human worker zones). These were given separately or together by inhalation 7 hr/day, 5 x/wk, for 4 mo.. At some point after exposures, Staphylococcus, human pathogen strain was given intranasally. Observations were made of the CNS, olfactory thresh- old, blood chemistry, lung morphology and function, and develop- ment of respiratory infection. NO <sub>2</sub> induced more pronounced changes than NH <sub>3</sub> . NH <sub>3</sub> (6 mg/M <sup>3</sup> ) + NO <sub>2</sub> (1.5 mg/M <sup>3</sup> ) enhanced the development of respiratory infection. Also either alone or both at these conc cause more severe pathological changes in rat lungs which had sustained repeated respiratory microbial infections.		
19. KEY WORDS  ammonia, nitrogen dioxide, infection, combined stresses, pulmonary function, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0343
4. TITLE (and Subtitle) Effect of Ferrous Sulfate Aerosols and Nitrogen Dioxide on Murine Pulmonary Defense		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Sherwood RL, Lippert WE, Goldstein E, Tarkington B		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-628 ES-1327 C: EPRI RP-680-1
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cal Schl Med Sect Infect & Immunol Dis & Primate Res Ctr, Davis		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 6P 35R
14. PUBLICATION  Arch Environ Hlth 1981 (3);36:130-135		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory studies mice were exposed to NITROGEN DIOXIDE at 1 ppm; also FERROUS SULFATE, aerosols (av diam 0.4 um) at 290 ug/M <sup>3</sup> , by inhalation for 24 or 48 hr, prior to or 4 hr after INFECTION with Staphylococcus aureus or Streptococcus Grp 3 by inhalation. NO <sub>2</sub> and/or FeSO <sub>4</sub> 24 or 48 hr exposures do not impair lung inactivation of Staph aureus. NO <sub>2</sub> and/or FeSO <sub>4</sub> 24 or 48 hr exposures decrease inactivation of inhaled Strep Grp C, and reduced survival times, without changing mortality. Exposure to either for 48 hrs prior to infection increases proliferation of the Strep C. FeSO <sub>4</sub> and NO <sub>2</sub> may interfere with defense mechanisms other than alveolar macrophage, especially the new influxes of phagocytes.		
17. KEY WORDS  nitrogen dioxide, ferrous sulfate, infection, combined stresses, pulmonary pathology, interactive responses		
18. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0002
4. TITLE (and Subtitle) Effects of Nicotine and Carbon Monoxide on Tissue and Systemic Changes in Rats		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Altland PD, Rattner BA		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIH-NIAMDD, Lab Chem Physics, Bethesda MD USN Med Res Instit Bethesda MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 12P 27R
14. PUBLICATION  Environ Res 1979 (June);19:202-212		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory studies rats (M SD) were exposed to: CARBON MONOXIDE at 100, 250, 500 ppm; also NICOTINE TARTRATE at 0.5-1.0 mg/Kg IP 1x/hr for 4 hrs. Tests included: blood levels of COHb, glucose, lactic acid, SGOT, SGPT respiratory rate, core temperature, etc. Nicotine alone increases respiratory rate, core T, COHb, without enzyme change. Each alone make only small change in glucose, lactic acid. Nic + CO have synergistic interactions. Nic (1 mg/Kg) + CO(100-500 ppm) raises blood glucose, lactic acid, and plasma aspartate aminotransferase. Nic (1) + CO (500) also raises plasma alanine aminotransferase. Direct catecholamine actions are released by Nic.		
19. KEY WORDS nicotine, carbon monoxide, combined stress, toxicity, plasma chemistry, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0288
4. TITLE (and Subtitle) Oxygenation during Inhibition of Drug Metabolism by Carbon Monoxide or Hypoxic Hypoxia		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Montgomery MR, Rubin RJ		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-34 support ES-CDA
9. PERFORMING ORGANIZATION NAME AND ADDRESS Johns Hopkins Schl Hyg Pub Hlth, Dept Envir Med, Baltimore MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 5P 22R
14. PUBLICATION  J Appl Physiol 1973 (4);35:505-509		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT In laboratory studies rats (M, Carworth) were exposed to: CARBON MONOXIDE (dose not avail) IP and into aortic-hepatic cannulae; also HYPOXIC HYPOXIA (levels not avail) to explore possible effects of CO on some sensitive metabolic enzymes. Greater drops in liver arterial O <sub>2</sub> content and venous O <sub>2</sub> tension are needed during CO exposure (compared with hypoxic hypoxia) to produce a given pharmacological response. With severe hypoxia drug metabolizing enzymes shift from blood flow limited (dependent) to O <sub>2</sub> limited systems. There are no data to show any direct effect of CO on such enzymes as Cytochrome P-450; its action is restricted to Hb bonding and related hypoxia.		
19. KEY WORDS  carbon monoxide, hypoxia, drugs, combined stresses, toxicity, zoxazolamine, oxygenation, liver function, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0027
4. TITLE (and Subtitle) Ozone and Nitrogen Dioxide Exposure. Murine Pulmonary Defense Mechanisms		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Goldstein E, Warshauer D, Lippert W, Tarkington B		8. CONTRACT OR GRANT NUMBER(s) G: NIH RR-169 G: PHS AP-628 G: Cal Air Resources Bd
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Cal Schl Med, Sects on Infect Dis & Med Microbiol; & Natl Primate Ctr, Davis		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 6P 38R
14. PUBLICATION Arch Environ Hlth 1974 (Feb);28:85-90		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments mice (M) were exposed to: OZONE at 0.11-0.4 ppm; also NITROGEN DIOXIDE at 2.0-7.3 ppm; by inhalation singly or together. INFECTIOUS AGENT, <sup>32</sup> P-labeled S.aureus in aerosol was instilled into lungs either 4 hrs prior to or after toxics exposure. Animals were prepared for analysis 10 min after last exposures. O <sub>3</sub> over long periods (17 hrs) was the sole agent causing such ventilation problems as tracheobronchial irritation, increased airway resistance, and shallow breathing patterns. Combined exposure impaired bacterial defense; perhaps by oxidant damage to alveolar macrophages, a direct toxic action of O <sub>3</sub> or NO <sub>2</sub> . Combined stressors did not affect physical removal of bacteria. O <sub>3</sub> and NO <sub>2</sub> act "indifferently" to cause this bacterial handling dysfunction at approx the individual gas injury thresholds.		
19. KEY WORDS ozone, nitrogen dioxide, infection, combined stresses, toxicity, pulmonary pathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0090
4. TITLE (and Subtitle) Effect of Air Pollution in the Area of a Chemical Plant on Workers with Chronic Ischemic Heart Disease, Bronchitis, or Pneumonia (Rus)		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Mikhailuts AP		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS USSR: Med Instit, Kemerov		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 3P 6R
14. PUBLICATION Gig trud (USSR) 1980 (3);1-3		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In occupational survey in the chemical industries, workers (Group 1: healthy; Group 2: chronic ischemic heart disease; Group 3: chronic bronchitis or pneumonia) were exposed to AMMONIA, NITROGEN OXIDES, SULFUR DIOXIDE; SULFURIC ACID aerosols, in various mixes with total conc in air of working zones at av 15%-50% of max permissible conc. Measurements were made of olfactory thresholds, exercise capacity, and lung function. In general, olfactory thresholds rose and respiration and circulation efficiency dropped as function of toxics levels and presence of concurrent disease of the cardiovascular or respiratory systems.		
17. KEY WORDS sulfur dioxide, nitrogen oxides, sulfuric acid, ammonia, combined stresses, chemical industry, pulmonary pathology, heart disease, bronchitis, pneumonia, interactive responses		
18. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0012
4. TITLE (and Subtitle) Controlled Studies of Human Exposure to Single and Combined Action of Nitrogen Dioxide, Ozone, and Sulfur Dioxide		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Von Nieding G, Wagner HM, Krekeler H, Lollgen H, Fries W, Beuthan A		8. CONTRACT OR GRANT NUMBER(s) G: Eur Cmnties Envir Pgm G: FRG Envir Pgm
9. PERFORMING ORGANIZATION NAME AND ADDRESS W GERMANY (FRG) Instit of Hlth, Berlin		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 15P 77R
14. PUBLICATION Intl Arch Occup Environ Hlth 1979;43:195-210		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory studies human subjects (11M ages 23-38 yr) were exposed to: NITROGEN DIOXIDE at 5 ppm; also SULFUR DIOXIDE at 5 ppm; also OZONE at 0.1 ppm; by inhalation, alone or in combination, including ternary mixes. In some experiments, immediately after exposure, there was a bronchial challenge with acetylcholine aerosol at 1,2,3 %. In all of the NO <sub>2</sub> exposures, lung airway resistance and arterial O <sub>2</sub> transfer dropped. With combined stresses, 8/11 showed no greater effect than NO <sub>2</sub> alone, except in 3, where there was a recovery delay after increased airway resistance(M). NO <sub>2</sub> +SO <sub>2</sub> +O <sub>3</sub> mix had no further effect on PaO <sub>2</sub> or R. There was greater reactivity to Acetylcholine after exposure to the mix. It is necessary to reconsider present allowable levels, when mixes are involved.		
17. KEY WORDS nitrogen dioxide, ozone, sulfur dioxide, combined stresses, acetylcholine, pulmonary function, interactive responses		
18. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0020
4. TITLE (and Subtitle) Effects of Repeated Exposures to Peak Concentrations of Nitrogen Dioxide and Ozone on Resistance to Streptococcal Pneumonia		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Ehrlich R, Findlay JC, Gardner DE		8. CONTRACT OR GRANT NUMBER(s) C: EPA 68-02-2274
9. PERFORMING ORGANIZATION NAME AND ADDRESS IITRI Life Sci Div Chicago IL		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 11P 7R
14. PUBLICATION  J Toxicol Environ Hlth 1979;5:631-642		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT  In laboratory experiments, mice were exposed to NITROGEN DIOXIDE at 0.1 ppm, 24 hr/day, 7 d/wk for 1,2,3,6 mo; also to OZONE at 0.1 ppm; exposures separately or in mixes, in some peak studies for 3 hr/day, 5 day/wk. At 1 hr after end of inhalation exposure, INFECTIOUS AGENT Streptococcus pyog. aerosol was instilled; in 17 some animals there was re-exposure to the toxics for 14 days. Peak combined exposures did most to reduce resistance to Strep pneumonia and enhance mortality rates. 3-mo exposure reduced clearance of inhaled Strep, and dropped total cell count recovered in lavage and viability and phagocytic activity of alveolar macrophages. 18 1-2mo exposure showed no big change in mortality or survival time. Sequence of exposures to toxic is important in reduced resistance to Strep pneumonia. Worst case is extended pollutant exposure even after Strep. Peaks are more stressful. Intermittent exposure standards are limited.		
19. KEY WORDS ozone, nitrogen dioxide, infection, combined stresses, pulmonary pathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0019
4. TITLE (and Subtitle) Health Effects of Short-Term Inhalation of Nitrogen Dioxide and Ozone Mixtures		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Ehrlich R, Findlay JC, Fenters JD, Gardner DE		8. CONTRACT OR GRANT NUMBER(s) C: EPA 68-02-2274 68-02-1267
9. PERFORMING ORGANIZATION NAME AND ADDRESS IITRI Life Sci Div, Chicago IL		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE
		13. NUMBER OF PAGES AND REFS
14. PUBLICATION Environ Res 1977;14:223-231		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory studies mice (F, CF-1 and CD2F1) were exposed to: NITROGEN DIOXIDE at 1.5-5.0 ppm; also OZONE at 0.05-0.5 ppm, each alone or in mixture, in single 2 hr exposure, or multiple 3 hr exposures daily 5 x/wk for 1, 2, or 4 wk, all by inhalation. At one hr after end of inhalation exposures, INFECTIOUS AGENT Streptococcus pyogenes Gp C was instilled into respiratory tract over 10 min period. Responses observed were mortality and lung bacterial clearance. There was a linear relation between mortality and conc of either NO <sub>2</sub> or O <sub>3</sub> alone. Survival times were shortened with 0.5 ppm O <sub>3</sub> or 3.5-5 ppm NO <sub>2</sub> . NO <sub>2</sub> and O <sub>3</sub> showed an additive effect after single 2 hr exposure. With multiple exposures, there is an excess mortality. An apparent synergy comes from capacity to clear inhaled bacteria impaired by inhaled mix of toxics; not from changes in deposit sites.		
17. KEY WORDS nitrogen dioxide, ozone, combined stresses, toxicity, infection, pulmonary pathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0024
4. TITLE (and Subtitle) Pathology of Pulmonary Disease from Exposure to Interdependent Ambient Gases, Nitrogen Dioxide, and Ozone		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Freeman G, Lujhos LT, Furiosi NJ Mussenden R, Stephens RJ, Evans MJ		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Stanford Res Instit, Life Sci Div, Menlo Pk CA		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-0842 C: EPA 68-02-1243
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Arch Environ Hlth 1974 (Oct);29:203-210		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 7P 27R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies, rats (ages 1 mo) were exposed to: OZONE at 0.5 ppm and 0.9 ppm for 12,24,48,144 hrs; also to NITROGEN DIOXIDE at 0.9 ppm on same schedule, in inhalation. Treatments were: O <sub>3</sub> alone at 0.5 or 0.9 ppm; NO <sub>2</sub> 0.9 ppm for 3 wks; O <sub>3</sub> (0.9) and NO <sub>2</sub> (0.9) continuously for 30 days; NO <sub>2</sub> at 2.5 and O <sub>3</sub> at 0.25 (10:1) for 24,40,96 hrs, and 2,3,26 wks. O <sub>3</sub> at 0.5-0.9 ppm in 24 hrs shows damage in bronchioles and alveolar ducts; NO <sub>2</sub> at 15-20 ppm changes epithelium of deeper bronchioles and ducts. There were additive effects of O <sub>3</sub> (eg from smog) and NO <sub>2</sub> (eg from smoking found in chronic obstructive pulmonary diseases, in related studies.		
19. KEY WORDS ozone, nitrogen dioxide, combined stresses, smog, toxicity, pulmonary pathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0336
4. TITLE (and Subtitle) Altered Function in Animals Inhaling Low Concentrations of Ozone and Nitrogen Dioxide		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Murphy SD, Ulrich CE, Frankowitz SH, Xintaras C		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS USPHS Div Air Pollut, Lab Med & Biol Sci Cincinnati OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1964
		13. NUMBER OF PAGES AND REFS 9P 28R
14. PUBLICATION  Am Indust Hyg J 1964;25:246-254		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, guinea pigs (GP) and mice (M) were exposed to: OZONE at 0.34-1.35 ppm for 2 hrs; also NITROGEN DIOXIDE, at 5.2-13.0 ppm for 4 hrs, and effects compared. In GP, the earliest effects for O <sub>3</sub> or NO <sub>2</sub> were an increased respiratory frequency and decreased tidal volume; an irritant response, caused in each case by a different mechanism. These effects were found even after O <sub>3</sub> 2-hr exposure at 0.34 ppm. Previous expos- ure to O <sub>3</sub> provided no help in tolerance. In mice, the same activities were depressed.		
17.		
18.		
19. KEY WORDS ozone, nitrogen dioxide, combined stresses, toxicity, pulmonary function, exercise, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0145
4. TITLE (and Subtitle) Evaluation of the Hazards of Ozone and Oxides of Nitrogen. Factors Modifying Toxicity		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Stokinger HE		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS PHS Occup Hlth Pgm, Cincinnati OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1957
		13. NUMBER OF PAGES AND REFS 10P 18R
14. PUBLICATION AMA Arch Ind Hlth 1957;11:181-187		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT In laboratory experiments, rats, mice, and hamsters were exposed to: OZONE at 4-11 ppm (approx LD <sub>50</sub> ) one time; also NITROGEN OXIDES (NO <sub>2</sub> , N <sub>2</sub> O <sub>5</sub> ) at 0.2-500 ppm; each alone, or their mixes. NxOx did not modify O <sub>3</sub> toxicity and mortality. O <sub>3</sub> toxicity was enhanced by exertion, alcohol, respiratory infection, and in young animals. O <sub>3</sub> toxicity was reduced or eliminated With intermittent exposure, and certain premedication.		
17.		
18.		
19. KEY WORDS ozone, nitrogen oxides, combined stresses, toxicity, infection, therapeutic drugs, prophylactic agents, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0318
4. TITLE (and Subtitle) Studies of Ozone Toxicity. 1. Potentiating Effects of Exercise and Tolerance Development		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Stokinger HE, Wagner WD, Wright PG		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS PHS Occup Hlth Pgm, Cincinnati OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1956
		13. NUMBER OF PAGES AND REFS 3P 9R
14. PUBLICATION  AMA Arch Ind Hlth 1956;14:158-160		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory experiments, rats and mice were exposed to: OZONE at 1 ppm for 6 hrs; alone or with EXERCISE in rotating cage 15 min/hr for 6 hrs; retested for tolerance after 1 day, then at 1, 2, 3, 4, 6 wks. There was enhanced toxicity to rats and mice from exercise during O <sub>3</sub> exposure. O <sub>3</sub> is fatal in 6 hrs 17 av of exercise is done for 15 min/hr during each exposure. A marked tolerance to O <sub>3</sub> developed within 24 hrs, and persisted for 4-6 wks, allowing survival of normally lethal conditions, for a high tolerance group. 18.		
19. KEY WORDS ozone, exercise, combined stresses, adaptation, toxicity, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0290
4. TITLE (and Subtitle) Effect of Threshold Limit Values of Sulfur Dioxide and Sulfuric Acid on Bronchial Clearance in Exercising Man		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Newhouse MT, Dolovich M, Obminski G, Wolff RK		8. CONTRACT OR GRANT NUMBER(s) G: MRC Canada MA-4265 G: Hlth & Welf Canada
9. PERFORMING ORGANIZATION NAME AND ADDRESS CANADA: St. Joseph's Hosp Respir Unit Hamilton, Ont. USA: Lovelace Fdtn, Inhal Tox, Albuquerque		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 9P 24R
14. PUBLICATION  Arch Environ Hlth 1978 (1-2);33:24-32		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  In laboratory studies, human subjects (about 290 healthy adults) were exposed to: SULFUR DIOXIDE at 5 ppm; also SULFURIC ACID at 1 mg/M <sup>3</sup> ; with one or both deposited via radiolabeled saline aerosol bolus as 3 um particles into large airways. Lung retention and clearance is faster when SO <sub>2</sub> + H <sub>2</sub> SO <sub>4</sub> are present. Max expiratory flow rates fell greatly with SO <sub>2</sub> , and less with H <sub>2</sub> SO <sub>4</sub> ; the acceleration of clearance is an irritant response. This study at rest was followed by one with mixed aerosol or components, then exercise for over 50 min, then rest for 1.5 hrs. After 0.5 hr rest in healthy who had exercised, only the SO <sub>2</sub> appears to reduce expiratory flow rate (a response to irritant). No combined effects are shown.		
19. KEY WORDS sulfur dioxide, sulfuric acid, exercise, combined stresses, tpxocoty, lung clearance, pulmonary pathology, aerosols, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0001
4. TITLE (and Subtitle) Long Term Exposure to Sulfur Dioxide, Sulfuric Acid Mist, Fly Ash, and their Mixtures		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Alarie Y, Krumm AA, Busey WM, Ulrich CE, Kantz RJ		8. CONTRACT OR GRANT NUMBER(s) G: Elect Res Council Air Poll Res Pgm (support only)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Hazelton Labs Vienna VA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1975
		13. NUMBER OF PAGES AND REFS 9P 18R
14. PUBLICATION Arch Environ Hlth 1975 (May);71:254-262		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies monkeys (170 cynomolgous M) and guinea pigs (400 GP) were exposed to: SULFUR DIOXIDE at 0.1-5.0 ppm; SULFURIC ACID at 0.1-1.0 mg/M <sup>3</sup> as mist; FLY ASH (from coal) at 0.5 mg/M <sup>3</sup> , particle sizes of all av 5 um. Treatments were single and mixes inhaled for 52 wk(M) and 78 wk (GP). SO <sub>2</sub> 5 ppm or ash 0.5 mg/M <sup>3</sup> or their mixes caused no changes in lung histology, function, hematology or blood chemistry in M or GP. H <sub>2</sub> SO <sub>4</sub> damage threshold was 0.1 mg/M <sup>3</sup> , significant over 1 mg/M <sup>3</sup> , with major impairment of lung ventilation and diffusion over 3.5 mg/M <sup>3</sup> . In ternary mixes, H <sub>2</sub> SO <sub>4</sub> is the sole source of damage.		
19. KEY WORDS sulfur dioxide, sulfuric acid, fly ash, combined stresses, mist, pulmonary function, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0037
4. TITLE (and Subtitle) Effects of Inhaled Sulfur Dioxide on Pulmonary Function in Healthy Adolescents**		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Koenig JQ, Pierson WE, Horike M, Frank R		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES P-1478
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Wash Schl Med Depts Envir Hlth & Pediatr, Seattle		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 5P 8R
14. PUBLICATION  Arch Environ Hlth 1982 (1);37:5-9		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT  In laboratory studies, human subjects (3F, 5M, ages 12-14 yr, determined as "healthy" in tests with cytology, exercise, methacholine challenge, IgE, etc) were exposed to: SULFUR DIOXIDE at 1 ppm and/or SODIUM CHLORIDE (0.9 um droplet aerosol) at 1 mg/M <sup>3</sup> , inhaled at ambient T of 22° C and 75% RH for 30 min, then EXERCISE on treadmill. Pulmonary function tests included total respiratory resistance, residual capacity, max flow, forced expiratory vol. At rest, SO <sub>2</sub> or NaCl alone had no or minor effects. SO <sub>2</sub> + NaCl caused small drop in forced expiratory volume. During exercise, NaCl alone had no effect; SO <sub>2</sub> or SO <sub>2</sub> + NaCl induced reductions in FEV and Vmax, with combined effects larger and longer. Effects found are lower than seen in asthmatic adolescents. The sites of deposition of stressor are more extensive after exercise.		
19. KEY WORDS  sulfur dioxide, aerosols, combined stresses, toxicity, exercise, pulmonary function, interactive responses, adolescents		
20. NOTES  ** Title continued: "...Exposure to SO <sub>2</sub> Alone or SO <sub>2</sub> plus Sodium Chloride Droplet or Aerosol during Rest and Exercise"  Other parts of this study will be found in Environ Res 1980;22:145 and 1981;25:340		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0360
4. TITLE (and Subtitle) Acute Effects of Inhaled Sulfur Dioxide and Sodium Chloride Droplet Aerosols on Pulmonary Function in Asthmatic Adolescents		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Koenig JQ, Pierson WE, Frank R		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Wash Schl Med Depts Envir Hlth & Pediatr, Seattle		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES P-1478 G; Wash Lung Assn
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION Environ Res 1980;22:145-153		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 9P 22R
		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory studies, human subjects (9 adolescents with history of extrinsic asthma, eg exercise-induced bronchospasm) were exposed to: SULFUR DIOXIDE at 1 ppm; also NaCl droplet aerosols (size 0.9 um) at 1 mg/M <sup>3</sup> , separately, or together, for 60 mins ea. Lung function tests included: total respiratory resistance, max flow at 50% and 75% of expired vital capacity, forced expiratory volume, and functional residual capacity. Studies were made at rest alone. There were no significant changes caused by NaCl alone; but SO <sub>2</sub> + NaCl produced more significant decrease in pulmonary functions (at small airway sites) than either agent alone. Asthmatics were found to be more sensitive than healthy non-smoking adults.		
19. KEY WORDS sulfur dioxide, sodium chloride aerosols, combined stresses, toxicity, pulmonary pathology, asthma, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0162
4. TITLE (and Subtitle) Prevention for Multifactorial Diseases		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Walter SD		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Yale Univ Schl Med Dept Epidemiol & Pub Hlth, New Haven CT		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 8P 21R
14. PUBLICATION Am J Epidemiol 1980 (3);112:409-416		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT This discusses a number of method concepts, including the choice between preventive strategies, and estimation of anticipated case reductions after population exposure modification for one or more hazards. (This includes personal and community interventions). Estimates may be made without knowledge of the joint distribution of exposure to risk. General conditions may be stated so that the factor attributable risks, calculated by ignoring all other factors, are unbiased effect measures. Effect of a factor on an individual's disease risk is often described by "relative risk" (arithmetic change in disease ratios); for entire populations is used "attributable risk". For multifactor disease, RR uses multivariate techniques for unbiased estimates. The interest is in identifying risk factors rather than looking at population distributions, where data sources are limited. Examples are given for studies on alcohol, tobacco, oral cancer, and cholesterol, blood pressure and CV dis. Methods for reducing large variable pools to small arrays are here		
17. KEY WORDS epidemiology, disease prevention, hazardous exposure, relative risk, attributable risk, multifactorial diseases, combined stresses, interactive responses, exposure models		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0069
4. TITLE (and Subtitle) Epidemiologic Problems Associated with Exposure to Several Agents		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Waxweiler RJ		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIOSH Taft Lab, Cincinnati OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 7P 16R
14. PUBLICATION Environ Hlth Perspect 1981;42:51-56		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT <p>In survey of methods for analyzing chronic disease outcomes, one matrix technic evaluating the contribution of 19 chemicals to the risk of liver angiosarcoma in vinyl chloride workers is discussed. There is a lack of good retrospective exposure data, so it is rare to determine a causal agent solely by using chronic disease occupational epidemiology. Early data may be on single agents eg in uranium mining there are data on radium and radon but not on radon daughters, whose dose is 20x larger. Also, in some locales, the mines have been worked for Ag, Co, Bi, Ni, As, and exposure to these is possible. There is further discussion on gathering retrospective data, with examples in rubber workers, herbicide use also other multiple agent analyses in vinyl chloride workers, arsenic workers.</p>		
19. KEY WORDS <p>Combined stresses, epidemiology, hazardous agents, occupational exposure, copper smelting, vinyl chloride, heavy metals, interactive responses, matrix method evaluation</p>		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0154
4. TITLE (and Subtitle) Epidemiological Investigation of Occupational Carcinogenesis using a Serially Additive Expected Dose Model		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Smith AH, Waxweiler RJ, Tyroler HA		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS NEW ZEALAND: Wellington Clin Schl Med Dept Community Hlth; USA: Univ NC SPH Occ Hlth Studies Gp, Ralgh		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 11P 18R
14. PUBLICATION  Am J Epidemiol 1980 (6);112:787-797		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT Studies of occupational carcinogens are complicated by: worker mobility within and between jobs and functions, and long latency between exposure and discovery of neoplasia. A Serially-Additive-Expected Dose Method shows cohort dose matrix, relating year 1st employed to age then, and to calendar year; facilitating study of relation of exposure dates and diagnosis or death dates. Also, a Cumulative Dose Concept, taken from work histories, further allows calculation of expected yearly exposure for each case. Data are needed on exposure to specific chemicals for each job in each yr. An example: angiosarcoma of liver and vinyl chloride exposure in a polymer plant is discussed. The methods can help to reveal the presence of combined factors, and whether they are acting independently or jointly.		
17. KEY WORDS epidemiology, carcinogenesis, dose models, occupational hazards, combined stresses, caprylyl alcohol, vinyl chloride		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0164
4. TITLE (and Subtitle) Significance of Cross-Sectional Surveys in Occupational Epidemiology		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Mur JM, Cavelier C		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FRANCE: Nat Res Instit Occ Safety & Hlth Vandoeuvre-les-Nancy		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 2P 9R
14. PUBLICATION  Scand J Work Environ Hlth 1982 (Suppl 1);8:24-25		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT  Modes of survey may conceal the real occupational risks. Occupational factors are only one etiologic determinant in multifactorial diseases. Also, the diversity of industrial processes leads to a dispersion of risks, and it is hard to avoid sampling biases both for cases and for referent controls. Only after several surveys by several groups showing no risk for a certain factor can results be seen as valid. Cross-section surveys are easier to do than longitudinal. In chronic health impairments like degenerative diseases with multifactorial etiologies, the progress transition, some with long latency, from good health to impairments may be hard to detect in early phases. In the occupational setting not only must the direct and local industrial factors be considered, but the indirect atmospheric and other factors must be dealt with.		
19. KEY WORDS		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0186
4. TITLE (and Subtitle) Anatomy of the Healthy Worker Effect- a Critique of Summary Statistics Employed in Occupational Epidemiology		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Wen CP, Tsai SP		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Tex Schl Publ Hlth, Houston		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 5P 32R
14. PUBLICATION Scand J Work Environ Hlth 1982 (Suppl 1);8:48-52		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT This is more accurately called the "active worker" effect and is expressed in lower morbidity and mortality referred to SMR (Standard Mortality Ratios). This may occur because of: improved economic status, subscription to medical insurance access and will to use care, changes in life style (eg socialization, reduced substance abuse, health education, reduced smoking, better mental health, etc) Although the SMR is all right for estimating relative risk in a small sample, there is a lack in comparability among SMRs (standards, age distributions, method issues, relative risk, life expectancy, length of observation, study methods. This may become exaggerated in cohort studies starting with young healthies but excluding retirees. It is recommended that at least three parameters be used to summarize mortality experience among the employed: relative risk, attributable risk, life expectancy.		
19. KEY WORDS		
20. NOTES		

EPIDEMIOLOGY  
COMBINED STRESS EXTRACTS

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0071
4. TITLE (and Subtitle) Effect of Oil Mists on the Irritancy of Sulfur Dioxide. 2. Motor Oil		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Costa DL, Amdur MO		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-T45 G: ES R827
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harvard Schl Publ Hlth Dept Physiol Boston MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 7P 11R
14. PUBLICATION  Am Ind Hyg Assoc J 1979 (9);40:809-815		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT  In laboratory studies, guinea pigs were exposed to: MOTOR OIL dispersed as a submicron aerosol at 100 mg/m <sup>3</sup> (The oil was either "new" Mobil SAE 10W-30 paraffin base with additives; or "used" from 3500 miles in engine of an old car.) SULFUR DIOXIDE, as a submicron aerosol was given at 1,10,50,100 ppm. Combined treatment typically used 50 ppm SO <sub>2</sub> + 100 mg/m <sup>3</sup> oil as aerosol. Actual treatments: SO <sub>2</sub> alone; or SO <sub>2</sub> + motor oil simultaneously; or MO for 30 min then SO <sub>2</sub> ; or MO 1 hr, 18 hr gap, then SO <sub>2</sub> + MO, then SO <sub>2</sub> alone. Exposures were 1/2-1 hr. MO alone was an irritant; SO <sub>2</sub> increases pulmonary flow resistance. MO new and used protected against the SO <sub>2</sub> irritant response. Pretreatment with MO failed to protect against SO <sub>2</sub> . The protective effect was lost when the MO was previously reacted with SO <sub>2</sub> . The active ingredients appear to be detergents and dispersants in the MO.		
19. KEY WORDS  sulfur dioxide, motor oil, combined stresses, pulmonary function, irritants, aerosols, interactive responses		
20. NOTES  Another part of this study will be found in this journal in 1979 (8);40:680-685		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0070
4. TITLE (and Subtitle) Effect of Oil Mists on the Irritancy of Sulfur Dioxide. 1. Mineral Oils and Light Lubricating Oil		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Costa DL, Amdur MO		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-T45 G: ES R827
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harvard Schl Publ Hlth Dept Physiol Boston MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 6P 19R
14. PUBLICATION  Am Ind Hyg Assoc J 1979 (8);40:680-685		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In laboratory studies, guinea pigs were exposed (head only) to: OIL of one of three types: MINERAL OIL at 11 mg/M <sup>3</sup> (Squibb medicinal, naphthenic, saturated HC), or PARAFFIN OIL at 14 mg/M <sup>3</sup> (Baker lab gradem aliphatic straight and branched chain), or LUBRICATING OIL at 21 mg/M <sup>3</sup> (ARCO light-lube, 67% paraffins, 32% naphthenic, 1% aromatic). They were also exposed to SULFUR DIOXIDE at 1, 10, 50, 100 ppm. Treatments were: O alone (aerosol av diam 0.5 u); or O + dissolved SO <sub>2</sub> ; either for 1/2-1 hr. Paraffin Oil protects pulmonary function from SO <sub>2</sub> , significantly at 1-10 ppm, completely at 50 ppm when given simultaneously. All the oils reduce response to SO <sub>2</sub> if they act at all; naphthenic oils at 100 mg/M <sup>3</sup> failed to protect against SO <sub>2</sub> at 50 ppm. Oils were most effective in protection against irritant bronchoconstriction when given as 30 min exposure just before SO <sub>2</sub> . Pulmonary flow resistance was the most sensitive measure of exposure to SO <sub>2</sub> .		
19. KEY WORDS sulfur dioxide, mineral oils, lubricating oil, combined stresses, pulmonary function, irritants, aerosols, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0115
4. TITLE (and Subtitle) Influence of Relative Humidity on Functional Effects of an Inhaled Sulfur Dioxide-Aerosol Mixture		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) McJilton CE, Frank R, Charlson RJ		8. CONTRACT OR GRANT NUMBER(s) G: PHS NIOSH OH-340
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Wash Depts Envir Hlth & Civil Engrg Seattle		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1976
		13. NUMBER OF PAGES AND REFS 7P 24R
14. PUBLICATION  Am Rev Respir Dis 1976;113:163-168		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT <p>In laboratory experiments, guinea pigs were exposed to: SULFUR DIOXIDE at 1 ppm; alone or in combination with SODIUM CHLORIDE aerosol at 1 mg/M<sup>3</sup>; also ambient atmosphere RELATIVE HUMIDITY at 40% RH or 80% RH. Treatments involved exposures for 60 min, recovery for 60 mins, and 2nd exposure for 60 mins, in 6 modes: SO<sub>2</sub> at low or high RH; NaCl aerosol at low or high RH; SO<sub>2</sub> + aerosol at low or high RH. Pulmonary flow resistance was measured. Lung compliance decreased during SO<sub>2</sub> + aerosol at high RH. There is a synergistic effect under these conditions. Deliquescent salts and high humidity result in droplets in which there is increased absorption of SO<sub>2</sub>. Also acidity extends the effects of the NaCl aerosol itself.</p>		
19. KEY WORDS sulfur dioxide, sodium chloride aerosol, combined stresses, toxicity, pulmonary function, humidity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0287
4. TITLE (and Subtitle) Role of Relative Humidity in the Synergistic Effect of a Sulfur Dioxide Aerosol Mixture on the Lung		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) McJilton C, Frank R, Charlson R		6. PERFORMING ORG. REPORT NUMBER
8. CONTRACT OR GRANT NUMBER(s) G: PHS NIOSH OH-340		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Wash Dept Envir Hlth & Civil Engrg Seattle		11. CONTROLLING OFFICE NAME AND ADDRESS
12. REPORT DATE 1973		13. NUMBER OF PAGES AND REFS 2P 12R
14. PUBLICATION Science 1973 (2 Nov);182:503-504		15. SECURITY CLASS. (of this report)
16. EXTRACT In laboratory experiments, guinea pigs (36) were exposed to: SULFUR DIOXIDE at 1.1 ppm placed into SODIUM CHLORIDE aerosol (NaCl at 1 mg/M <sup>3</sup> in water) particle diam 0.1-2.0 um. In the treatments here exposure was to 1 mode for 1 hr, filtered air 1 hr, next mode 1 hr, in random order: SO <sub>2</sub> in air under 40% RH; SO <sub>2</sub> in air over 80% RH; NaCl in atmosphere under 40% RH; NaCl in air over 80% RH; SO <sub>2</sub> + NaCl at low RH; SO <sub>2</sub> + NaCl at high RH. Pulmonary flow resistance increased significantly only when SO <sub>2</sub> and NaCl were given at high RH. Elevated RH enhances the interaction between SO <sub>2</sub> and certain aerosols. At high RH, the NaCl particles hydrate and SO <sub>2</sub> uptake goes faster.		15a. DISTRIBUTION
19. KEY WORDS sulfur dioxide, sodium chloride aerosol, combined stresses, toxicity, pulmonary function, humidity, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0173
4. TITLE (and Subtitle) Effects of Sulfur Oxide and Respirable Particles on Human Health. Methodology and Demography of Populations in Study		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Ferris BG Jr, Speizer FE, Spengler JD, Dockery D, Bishop YM, Wolfson M, Humble C		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-2 C: EPA 68-02-3201 C: EPRI RP-1001
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harvard Schl Publ Hlth & Med Schl Boston MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 4P 13R
14. PUBLICATION Am Rev Respir Dis 1979 (4);120:767-769		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT In behalf of later epidemiological studies, a sample of the population was gathered at random from city directories, of adult population ages 25-74 yrs, in 6 communities following census format, to total of 18,000 candidates. The method for gathering data included: personal interview (and UK-MRC questionnaire), non-medical sampling of pulmonary function (eg with portable spirometer, of forced vital capacity, etc) and other assessment of health; air monitoring for SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub> and respirable particles (seeking gradations of exposure, eg to SO <sub>2</sub> to av 80 ug/M <sup>3</sup> . Smoking habits were noted. The validity of the approach and of the sample was verified for future data collection.		
17. KEY WORDS sulfur dioxide, particulates, combined stresses, epidemiology, toxicity, pulmonary function, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0174
4. TITLE (and Subtitle) Sulfur Dioxide and Nitrogen Dioxide Levels Inside and Outside Homes and the Implications on Health Effects Research		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Spengler JD, Ferris BG Jr, Dockery DW, Speizer FE		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harvard Schl Publ Hlth & Med Schl Boston MA		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-2 ES-1108 C: EPRI RP-1001
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  Environ Sci & Technol 1979 (Oct);13:1276-1280		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 5P 23R
		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT <p>In a continuing epidemiological study in 6 communities where a population sample has been under observation, for one year there was monitoring continuously of total suspended particulates, respirable particulates, and the SO<sub>2</sub> and NO, NO<sub>2</sub> and O<sub>3</sub> fractions in these particulates and in the air. The monitoring was done outdoors and indoors, with spatial distribution measured at several sites where samplers were left. Some sources: smoking, fuel, cooking, heating were noted. Typically, in 6 outdoor sites, 4 were below 50% of NAAQS (Nat'l Atmo Air Qual Stds) limits, and 2 were violations.</p>		
19. KEY WORDS <p>sulfur dioxide, nitrogen dioxide, combined stresses, toxicity, indoor environments, outdoor environments, pollutants monitoring, interactive responses</p>		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0174
4. TITLE (and Subtitle) Assessment of the Health Effects of Atmospheric Sulfur Oxides and Particulate Matter: Evidence from Observational Studies		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Ware JH, Thibodeau LA, Speizer FE, Colome S, Ferris BE Jr		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-1108 C: EPRI RP-1001 C: EPA for prep of AQCD
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harvard Schl Publ Hlth & Med Schl Boston MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 12P 91R
14. PUBLICATION  Environ Hlth Perspect 1981 (Oct);41:255-276		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  This review discusses: methodological problems in observational studies) eg measurement criteria, accuracy, use of secondary reports, controls; specific health effects of acute exposure to SULFUR OXIDES AND PARTICULATES, use of formal collections and reports of urban mortality and morbidity from U.S. and outside 17. sources, with attention to CHES (EPA Community Health and Environment Surveillance) data. A critique is provided on the epidemiological limitations of the current National Ambient Air Quality Standards. There are referrals to other work on identification of health effects, quantifying effects at different ambient concentrations, estimation of the number of people exposed, and the calculation of overall health risk associated with a given degree of "air quality". 18.		
19. KEY WORDS  sulfur dioxide, particulates, combined stresses, mortality, interactive responses, epidemiology		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0124
4. TITLE (and Subtitle) Effects of Sulfur Dioxide plus Sodium Chloride Aerosol Combined with Moderate Exercise on Pulmonary Function in Asthmatic Adolescents		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Koenig JQ, Pierson WE, Horike M, Frank R		6. CONTRACT OR GRANT NUMBER(s) G: NIH ES P-1478 G: Wash Lung Assn
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Wash Schl Med Depts Envir Hlth & Pediatr, Seattle		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 9P 24R
14. PUBLICATION Environ Res 1981 (3);25:34-348		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT In laboratory studies, human subjects (8, ages 14-18 yrs, with extrinsic asthma, eg exercise-induced bronchospasm) were exposed to SULFUR DIOXIDE at 1 ppm; also NaCl droplet aerosols, with particle size 0.9 um, at 1 mg/M <sup>3</sup> ; given separately or together, then 30 min rest, then EXERCISE on treadmill for 10 min. Respiratory function tests included: total respiratory resistance, max flow at 50% and 75% expired vital capacity, forced expiratory vol, and functional reserve. Exercise concurrent with exposure to SO <sub>2</sub> + NaCl produced significant changes in the partial flow-volume curves, FEV 1.0, Vmax 50 & 75, and resistance. Changes were greater than those during exposure or at rest or seen in healthy subjects.		
19. KEY WORDS sulfur dioxide, sodium chloride, aerosols, exercise, combined stresses, toxicity, pulmonary function, asthma, adolescents, interactive responses		
20. NOTES Another part of this study will be found in Environ Res 1980;22:145		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0161
4. TITLE (and Subtitle)  Additive, Multiplicative, and other Models for Disease Risks		5. TYPE OF REPORT & PERIOD COVERED  Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Walter SD, Holford TR		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Yale Univ Schl Med Dept Epidemiol & Pub Hlth, New Haven, CT		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 6P 18R
14. PUBLICATION  Am J Epidemiol 1978 (5);108:341-346		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  Among those models providing simplified extraction of real disease factors, additive models are not the only ones allowing adequate evaluation of the causal nature of several risk factors at a time. Some models may mask the interactions by arbitrary transformations used. Consider "attributable risk", which is used generally where 17. there is a single binary risk factor, and assuming that causal effect of the factor is measured by an arithmetic difference in disease rates of exposed vs unexposed. "Population attributable Risk" requires data on "prevalence" of the factor. The relations 18. among several epidemiological and statistical models are discussed		
19. KEY WORDS epidemiology, statistical models, additive risk models, attributable risk, multiplicative risk models, multiple hazard exposures		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0156
4. TITLE (and Subtitle) Interaction in Epidemiologic Studies		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Kupper LL, Hogan WD		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-RCDA
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ NC Schl Pub Hlth Dept Biostat Chapel Hill		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 7P 14R
14. PUBLICATION Am J Epidemiol 1978 (6);108:447-453		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT This discusses formulations of "no interaction" hypotheses applicable to case-control data, probability measures including procedures for analysis of multidimension contingency tables for factors measured at more than 2 levels. Comparison with existing epidemiological models of synergy are considered. Tests of null hypotheses for no-synergy are really tests of independence of a specific type in the risk factors under study.		
17. 18.		
19. KEY WORDS epidemiology, interaction analyses, case-control studies, synergy indices, risk factors, multiple hazard exposures		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0160
4. TITLE (and Subtitle) Alternatives to Rothman's Approach for Assessing Synergism (or Antagonism) in Cohort Studies		5. TYPE OF REPORT & PERIOD COVERED Jnl article
7. AUTHOR(s) Hogan MD, Kupper LL, Most BM		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIEHS Biometry Br, Res Tri Pk NC; Univ NC SPH Dept Biostat, Chapel Hill		8. CONTRACT OR GRANT NUMBER(s) G: NIH ES-RCDA
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 8P 7R
14. PUBLICATION Am J Epidemiol 1978 (1);108:60-67		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT Rothman had proposed a ratio-type index for quantifying the joint effect of 2 or more factors acting in combination (eg binary variable like mortality) in the presence of non-zero background effects. Simple technics discussed here are: "linear contrast by observed risk"; an additive approximation to a probabilistic model of interaction; and a likelihood-ratio test (an approximation variant on Rothman's model).		
17.		
18.		
19. KEY WORDS epidemiology, multiple risk factors, interaction analysis, statistical models, synergy		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0155
4. TITLE (and Subtitle) Synergism and Interaction: are they Equivalent?		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Blot WJ, Day NE		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIH, NCI, Bethesda, MD		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 2P 3R
14. PUBLICATION  Am J Epidemiol 1979 (1);110:99-100		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  This methods paper discusses interaction, defined as a model-dependent concept, as in statistical models, including additive and multiplicative types. Synergy is discussed as a particular type of interaction, eg in public health models, based on a null model showing excess relative risk so that joint exposure to 2 or more factors yields more cases than exposure to the sum.		
17.		
18.		
19. KEY WORDS epidemiology, multiple risk factors, statistical models, interaction analyses, synergy, additive models		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0157
4. TITLE (and Subtitle) Interaction and Synergism		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Saracci R		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS FRANCE: IARC (Internat Agcy Res on Canc) Lyon		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 2P 4R
14. PUBLICATION Am J Epidemiol 1980 (4);112:465-466		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT This methods paper discusses concepts for distinguishing interaction and synergism: the statistical, including additive models, with multiplicative models a special case of the additive model and where interactions are explicit and computable; biological, with many specific mechanism models; public health models (eg dealing with elimination of excess incidence rate due to a specific agent, by its removal from the scene.		
17.		
18.		
19. KEY WORDS epidemiology, interaction analyses, additive models, multiplicative models, biological models, public health models, multiple risk factors		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0159
4. TITLE (and Subtitle)  Synergy and Antagonism in Cause-Effect Relationships		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Rothman KJ		8. CONTRACT OR GRANT NUMBER(s)  G: NCI CA-P6373
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Harvard Schl Pub Hlth Dept Epidemiol Boston MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1974
		13. NUMBER OF PAGES AND REFS 4P 3R
14. PUBLICATION  Am J Epidemiol 1974 (6);99:385-388		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  This discusses 2 agents as causes of an outcome, where either agent may modify the way the other produces the effect; the causal chains may have at least one common part. This also considers cause as linked to all-none effects, where other secondary factors at random may bring the system to readiness for all-none. Discusses linear dose-response curves, also synergies in non-linear responses eg where different % fractions of receptor populations need activation by agents 1 or 2, to produce response. Other ideas of synergy are discussed.		
17. KEY WORDS epidemiology, multiple exposure events, interaction analyses, additive models, synergy, antagonism		
18. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0158
4. TITLE (and Subtitle) Concepts of Interaction		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Rothman KJ, Greenland S, Walker AM		8. CONTRACT OR GRANT NUMBER(s) G: Millbank Fdtn C: NIH NS N01-NS-8-2399
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harvard Schl Pub Hlth Dept Epidemiol Boston, MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1980
		13. NUMBER OF PAGES AND REFS 4P 5R
14. PUBLICATION Am J Epidemiol 1980 (4);112:467-450		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT This report on epidemiological methods proposes use of specific yardsticks to examine possible synergies between 2 or more causes of disease. The interactions found may be "model dependent", and the approaches include: "statistical" interactions, interdependence between factors in a given model of risk, a predictive model not necessarily based on biological reality; "biological" interactions concerned with interdependence of several disease causing factors (eg initiation and promotion); specification of mechanism can be exact. Etiological factors may be additive, acting on the same step in a multistage process, or multiplicative, acting at different steps in the process. "Public Health" interactions consider the proportional contribution of each risk factor to the number of disease cases occurring in a population; "decision making" interactions among classes of risk; eg risk is same for normo- and hypertensives for CV complic from contraceptive, absolute risk is greater.		
19. KEY WORDS epidemiology, multiple causative factors, statistical interactions biological interactions, public health interactions, risk analysis, interaction models		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0230
4. TITLE (and Subtitle)  Statistical, Biological, and Public Health Concepts of Interaction		5. TYPE OF REPORT & PERIOD COVERED Abstract
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Rothman KJ, Greenland S, Walker AM		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Harvard Schl Pub Hlth Dept Epidemiol Boston MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 1P no R
14. PUBLICATION  Am J Epidemiol 1981;109:424 (abstract)		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT  This abstract of a presentation to the 13th meeting of the Society for Epidemiological Research discusses ways to determine if 2 or more risk factors are synergistic, considering that the identification of interaction is "model dependent". Concepts include statistical interaction (defined arbitrarily), biological interaction (with specific causal mechanisms, which really sort out synergism vs independence), and public health interaction (where synergy denotes an excess over additivity of attributable incidences)  17.  18.		
19. KEY WORDS  epidemiology, multiple risk factors, model-dependent interaction, statistical models, biological models, public health models, synergy, additive systems		
20. NOTES		

SURVEYS  
COMBINED STRESS EXTRACTS

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0269
4. TITLE (and Subtitle)  Health Effects of Combined Exposures in the Work Environment		5. TYPE OF REPORT & PERIOD COVERED Review Monograph
		6. PERFORMING ORG. REPORT NUMBER WHO-TR-662
7. AUTHOR(s) McDonald JC (Chf Ed) **		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS WHO (World Hlth Orgzn) Geneva, Switzerland		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1981
		13. NUMBER OF PAGES AND REFS 76 P 272R
14. PUBLICATION Monograph: WHO Tech Report Series No.662, Office of Occupational Health, WHO, Geneva.		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT This excellent report covers these topics: types of combined exposures (CE); quantification of effects of CE; mechanisms of response to CE(interactions in environment, biological response to chemical agent CE, interaction of chemical and physical agents); review of relevant animal and human studies; personal factors 17. affecting response to CE (genetic, disease, nutrition, treatment drugs, ethanol, smoking); CE and occupational cancer; epidemiological approaches; practical applications (in occ hlth practice, in standard setting, in research); and recommendations. Many studies are cited, but mechanisms of interaction are not discussed 18. in detail.		
19. KEY WORDS		
20. NOTES ** Chairman of Expert Committee which held Symposium on this topic, and of Board which prepared and Edited this report of the Symposium. Dr. McDonald is located at the London School of Hygiene and Tropical Medicine.		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0268
4. TITLE (and Subtitle)  Combined Environmental Stresses		5. TYPE OF REPORT & PERIOD COVERED Review
		6. PERFORMING ORG. REPORT NUMBER NASA SP-3006, 1973
7. AUTHOR(s)  Murray RH, McCally M		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Univ Indiana Schl Med, Indianapolis; AF Aerosp Med Res Lab, WPAFB OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 34P 136R
14. PUBLICATION  Chapt 19, pp 881-914 in: "Bioastronautics Data Book", 2nd Ed Parker J Jr, West IR (Eds), NASA 1973		15. SECURITY CLASS. (of this report)
		16. DISTRIBUTION
16. EXTRACT of A number of topics on combined stresses (CS) are discussed: the characterization of interaction (type, order of occurrence, duration of exposure and severity); interaction of environmental stresses with host factors; specific stresses incl. electromagnetic, thermal, atmospheric, electromagnetic, chemical-toxic, host factors incl. genetic, age, sex, activity, fatigue, illness, nutrition, etc); complexity of simulation, and availability of simulators around the U.S. A variety of tables are presented.		
18.		
19. KEY WORDS  thermal stress, electromagnetic radiation, atmosphere, toxic chemicals, confinement, combined stresses, space environment, simulation, interactive response models		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0068
4. TITLE (and Subtitle) Strategy for the Assessment of Neuro-behavioral Consequences of Environmental Factors		5. TYPE OF REPORT & PERIOD COVERED Jnl review
7. AUTHOR(s) Tilson HA, Cabe PA		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIEHS, Lab Behav & Neur Toxicol, Res Tri Pk NC		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
		12. REPORT DATE 1978
		13. NUMBER OF PAGES AND REFS 13P 61R
14. PUBLICATION Environ Hlth Perspect 1978;26:287-299		15. SECURITY CLASS. (of this report)
		15a. DISTRIBUTION
16. EXTRACT This discusses a proposal to validate behavioral tests with known neurotoxins and human toxicosis symptoms. Substances picked to test include: triethyl tin, acrylamide, methylmercury; and an array of psychomotor, cognitive, and affective response measures. There is extended discussion of specific neurological and psychological signs of deterioration; and utility of the procedures for arriving at prediction of events is considered.		
17. 18.		
19. KEY WORDS chemical toxics, combined stresses, animal models, neurotoxins, human toxicosis, test strategy, neuropathology, behavior, interactive responses		
20. NOTES		



REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0247
4. TITLE (and Subtitle)  Mixed Exposures to Chemical Hazards		5. TYPE OF REPORT & PERIOD COVERED Jnl review
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Freundt KJ		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  W GERMANY (FRG): Univ Heidelberg Fac Med at Mannheim, Dept Toxicol & Pharmacol		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1982
		13. NUMBER OF PAGES AND REFS 33P no R
14. PUBLICATION  Occup Hlth Safety 1982 (8);6:10-42		15. SECURITY CLASS. (of this report)
		15a DISTRIBUTION
16. EXTRACT Discussions of toxicodynamic interactions (eg at receptor sites) and toxicokinetic events (eg in transport, metabolism, transformation and disposal) are illustrated with examples of mixed toxics encountered in mines, foundries, steel working, auto repair, etc. Metals (Cr, Ni, Cu, Fe, Mn, Ti, Pb, Zn), gases (mixed irritants: SO <sub>2</sub> , O <sub>3</sub> , NO <sub>2</sub> ) solvents encountered in work with shoes, furniture, fibers, handicrafts, painting); plastics chemicals, pesticides, dusts, and drugs in context of mixed exposure are considered in this analysis.		
17.		
18.		
19. KEY WORDS  multiple chemical exposures, combined stresses, toxicity, pharmacokinetics, metals, gases, solvents, plastics, drugs, interactive responses		
20. NOTES		



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APPENDIX B

SUPPLEMENTARY BIBLIO. 1

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0237
4. TITLE (and Subtitle) Hypersusceptibility and Genetic Problems in Occupational Medicine, A Consensus Report		5. TYPE OF REPORT & PERIOD COVERED Jnl review
7. AUTHOR(s) Stokinger HE, Scheel LD		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS NIOSH, Div Labs, Toxicol Br, Cincinnati OH		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. PUBLICATION  J Occup Med 1973 (7);15:564-573		12. REPORT DATE 1973
		13. NUMBER OF PAGES AND REFS 10P 43R
		15. SECURITY CLASS. (of this report)
16. EXTRACT Kinds of basic problems discussed are: missing/deficient essential substance; deficiency or absence of enzyme system; alteration of cell transport of metabolite; abnormal antibody production; and abnormal proteins. For each selected topic is considered: the relative frequency of the disorder; specific environmental traits that can precipitate the abnormal response; tests for the lesion recommended for industry; and status of acceptance of industrial testing. Of 92 human disorders where a genetically determined eg enzyme deficiency has been identified, 5 were selected which meet certain prerequisites for improving effectiveness and reducing risk on the job. These are developed in detail: serum antitrypsin deficiency; glucose-6-pd; CS <sub>2</sub> hyperreactivity; abnormal antibody production; hemoglobins in sickle cell anemia.		
19. KEY WORDS  genetic lesions, toxic susceptibility, immunopathology, interactive responses		
20. NOTES		

REPORT DOCUMENTATION PAGE		
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. CATALOG NUMBER A0255
4. TITLE (and Subtitle)  Nutrient-Toxicant Interactions: Susceptible Populations		5. TYPE OF REPORT & PERIOD COVERED Jnl article
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  Mahaffey KR, Vanderveen JE		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS  FDA Bur Foods Div Nutr Eash DC		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1979
		13. NUMBER OF PAGES AND REFS 7P 33R
14. PUBLICATION  Environ Hlth Perspect 1979 (4);29:81-87		15. SECURITY CLASS. (of this report)
		15. DISTRIBUTION
16. EXTRACT  Nutrition and susceptibility to diseases and altered effects of toxic substances are discussed. Topics covered include: mechanisms of interactions and point of NTI. Influence of nutrients on cell toxicity by sequestering mechanisms, competition for absorption; nutrient aids in metabolizing some toxics to inactive form; 17 enhanced toxic effects in malnutrition; interaction at enzyme-controlled synthesis steps; severities of nutritional deficiencies as measured by toxicity increases; and a variety of topics concerning modulation of the toxicity of heavy metals by form, content, adequacy of diet. 18.		
19. KEY WORDS  nutrients, toxicants, combined stresses, disease susceptibility, undernutrition, interactive responses		
20. NOTES		

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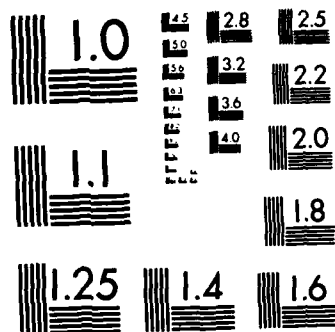
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